ASM GOLD Report

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Caveats and Limitations

Information given in this report is based on the best and most reliable data that the Pact team was able to obtain in the time available. Miners, traders, and others associated with artisanal mining are often reluctant to share information for a range of reasons, including: possible illegal status; suspicion as to why they are being asked; reluctance to disclose personal information to strangers or to let others know about what they might have that is worth stealing; and fear of increased taxation or reprisals. The subject matter of this report is of a highly sensitive nature, and many individuals were hesitant to discuss details of illegal gold mining and trading as they did not want to implicate themselves or their colleagues. The full identity of all individuals who provided information for this report has been kept confidential.

Pact upholds and respects Zimbabwe and international legislation regarding artisanal mining and mineral trading. However, Pact is also aware that creating a climate of fear in the mines without providing any positive interventions to address the root causes of illegal activity is likely to make it increasingly difficult to contribute to the process of formalization.

Recommendations in this report are proposed in good faith based on our analysis of the current dynamics observed in the gold mines, processing facilities and trading points of the Midlands of Zimbabwe; on our knowledge of best practices in the mining sector; on our previous experience in artisanal small-scale mining; on our knowledge of and commitment to improving the lives and the economic and legal status of artisanal miners; and on what we consider to be responsible, effective, and practical measures.

Our over-riding commitment is to support the Government of Zimbabwe and the artisanal and small-scale gold miners and traders to transform the dynamics in the sector to the benefit of all involved and to contribute to the long-term prosperity of Zimbabwe.

Executive summary

In Zimbabwe, it is estimated that artisanal and small-scale mining (ASM) provides a direct livelihood for more than one million people, critical for a country grappling with high unemployment. There is a growing consensus amongst key stakeholders in the ASM that the Government's policy shift towards increasing the economic emphasis on ASM gold creates both an immediate need and an important opportunity to formalize the ASM sector.

With the support of the UK Department for International Development (DfID) and the United States Agency for International Development (USAID), Pact conducted a baseline study of the ASM sector on behalf of the Chamber of Mines of Zimbabwe (COMZ) and the MMMD and Minerals Development (MMMD) in a bid to gain an understanding of the dynamics of gold production, gold processing, gold trade and regulation of the sector. It was envisioned that such a study would provide an important perspective on challenges to, and opportunities for, formalizing and integrating ASM with LSM. The baseline study utilized qualitative and quantitative methods of data collection with the help of mobile technology. It was carried out in two administrative districts, Shurugwi and Kadoma, where the target groups were artisanal miners of all ages and gender, small scale miners, large scale miners (LSM), millers, gold traders and Government officials.

The baseline study had 628 respondents from these two major gold mining districts of whom 30% were female. Of the 628 respondents, around 40% were people from surrounding communities who were not engaging in mining activities and who composed the control group. Of those respondents engaging in mining, around 70% were working on mines with a certificate of registration and a valid annual licence (fully formal operations) for operation and 20% were working in unregistered mines with no valid license for operation (informal operations) while the remaining 10% were operating on registered claims that are not licenced (partially formal operations). It was also discovered that 70% of miners were unskilled.

Zimbabwe has a long and interesting history of ASM which saw the vertical movement of many small mining operations to medium and large scale operations over the greater period of the past century. This was followed by an exponential growth in the population of artisanal and small scale miners over the past three decades fuelled by record unemployment, high commodity prices and a decline in agricultural activity due to droughts and economic downturn.

The Zimbabwean Government has interacted with ASM in a myriad of ways over the past three decades: from ignoring the growing sector in 1980s, to becoming a global leader in engaging the sector in the 90s through pro-poor interventions such as legalizing gold panning and stabilizing gold prices. In the early 2000s, against the background of deteriorating economic conditions, the Government sought to increase gold flows to its official buyer Fidelity Printers and Refiners (FPR) and provided low-interest equipment loans, liberalized gold buying and provision of technical support through MMMD. Whilst these interventions succeeded in boosting gold production, most of the gold ended up on the black market and the Government responded with fury through *Operation Chikorokoza Chapera* which effectively criminalized ASM and adversely affected a lot of legitimate small-scale miners and custom millers. In recent years the Government has started reconsidering formalization of ASM.

The Government's evolving stance on ASM has affected Non-Governmental Organization (NGO) and donor interactions with the sector as revealed by the lack of any involvement in the 1980s, the many different projects introduced in the 1990s, and the reluctance of NGOs and donors to directly engage the sector in the years when it was illegal. There is today, a growing focus on ASM, influenced by Government's current positive policies. In the 1990s, German Federal Enterprise for International Cooperation (GIZ), then known as GTZ, focused on environmental rehabilitation while the Austrian

Foundation for Small Mines (AFSM) provided soft loans and grants, and NGO, Practical Action, set up the Shamva Milling Centre (SMC). The SMC was such a success that it has been hailed in literature and been emulated in other countries. The project ended, however, when it was handed over to an inadequately prepared and under-resourced local association. GTZ's project recorded some successes but did not last long after GTZ's presence ended, while the AFSM financing project failed due to high administration costs, low reimbursements and complex requirements to obtain a loan.

The LSM sector has, over the years, also interacted with ASM in various ways. In some instances, LSM capacitated the police in repressing ASM activities. However there have also been positive engagements though these have typically been when individual mines/companies have developed relationships with ASM in isolation rather than industry-level initiatives. These interactions vary from tributing agreements in which parts of concessions are effectively sub-contracted out to ASM actors, to provision of technical support. Examples of mutually beneficial relationships include Dalny Mine's provision of claims to ASM and Redwing Mine which allowed miners to work old waste dumps. Other private entities such as banks have provided bank loans and participated in gold trading.

It has been estimated in previous studies and reports that over a third of artisanal miners are women which is contrary to the baseline survey findings in which it was discovered that only 11% of artisanal miners in the two target areas are women. Women have been encouraged by the Government to engage in small-scale mining and several organizations exist that represent the interests of women miners. While the existence of child miners has been cited as a major challenge in many countries, it has not been noted as a major challenge in Zimbabwe either in literature or from the baseline study results. It is recognised that quantification of an illegal activity presents many challenges therefore the true levels of child labour are hard to ascertain. It is key to note that while relatively few children may be engaged directly in ASM, those that are present are heavily engaged.

Environmentalists have been some of the leading critics of ASM formalization due to the high level of environmental degradation caused by mineral extraction and the impacts of mercury use. The baseline study, while not focusing on mercury use, was cognisant of it and it was observed that mercury is still widely used and often through open air amalgamation. It was also observed that there are currently very few alternatives to mercury use and any that exist are generally not appealing to miners.

Zimbabwe's mining legal and policy framework is generally burdensome, with over 40 Acts of Parliament regulating mining operations. Of these, 24 Acts directly impact ASM together with relevant statutory instruments that fall under them. The principal Act is the Mines and Minerals Act (MMA) (Chapter 21:05) which does not recognise ASM nor does it differentiate between LSM and Small-Scale Mining (SSM). This is a major disadvantage for ASM because they don't have the same levels of financial and technical resources that LSM possesses and ASM actors are ill-informed of the various intrinsic requirements of the mining law.

Statutory Instruments such as Explosives Regulations Chapter 10:08 of 1989, Mining (Managements and Safety) Regulations SI 109 of 1990, Mining (Health and Sanitation) Regulations SI 182 of 1995 are examples of legislation where ASM on the ground falls far short of the requirements. The MMA is old and it has become extremely difficult to marry it with key policies meant to stimulate growth within the mining industry and ultimately benefit the nation socio-economically. These key policies include Zim-Asset; the Draft Minerals Policy; the National Budget Statement pronouncements on taxes; and the various policy changes announced in the November 2014 Press Statement by the Minister of Mines.

Zimbabwe is one of only six countries with a state controlled gold market. The Gold Trade Act (Chapter 21:03) singles out the RBZ through FPR as the sole buyer of gold in the country. ASM are charged 3% mining royalties on gold and a 3% presumptive tax was recently removed. The cost of annual licencing

(USD8,000) is deemed as too high by millers and less than half of them comply. In order to ensure compliance across the entire gold mining and trading sector it is imperative that the costs of compliance are rationalized.

Gold flow within Zimbabwe was reported to be composed of a complicated network of many players. Some of this gold ends up in the formal market via FPR while other material ends up in the informal (grey market). Up to two thirds of surveyed miners said they sell to the formal market. Other stakeholders had varying opinions on the proportion of gold that ends up in the grey market with estimates ranging between 10% and 90% of ASM gold produced flowing in informal circuits. It was interesting to note that almost half of the miners were unaware of the FPR price for gold while only 35% were unaware of the informal price for gold suggesting that miners are engaging more with the informal traders than the formal trading system. However the 65 % of miners stated that they sold their gold on the formal market (to FPR and millers) while 35% admitted to selling on the informal market (traders, claim owners and sponsors). It can thus be estimated that between 35% and 50% of miners sell their gold on the formal market (which translates to the 130kg of gold FPR is receiving a month). The estimate of gold making it to the informal sector is thus between 130kg and 240kg of gold per month.

The reasons why FPR is not often a favoured market include: the higher prices paid by the informal market, high regulatory fees and levies required in the formal market, the inconvenience of selling gold at FPR gold buying centres, insecurity in transporting gold, and the lack of effective enforcement of existing regulatory requirements with regard to artisanal gold production and sales.

In order to formalize ASM gold mining and trading the following models of intervention have been recommended:

Model	Description	Target Groups	Merits	Demerits
LSM Co-existence Strategy	Co-existence of LSM, SSM and ASM through allocation of ore bodies of appropriate scale and accessibility on a business/contractual basis by LSM to ASM/SSM. This will be supported by provision of technical support.	LSM SSM ASM Women Youth	• Integrates the gold sector • There is existing buy-in • Ensures skills transfer and professionalization of the sector • Can be combined with syndication	• May leave out the most marginalized ASM groups
Miller – Service Centre Strategy	Improving existing mills to service centres where more efficient and environmentally sensitive milling takes place and miners have improved recovery of gold and	Millers ASM SSM	• Focuses on the nexus of the ASM gold sector – the mill. • Introduces performance standards and provides a central point for monitoring	• Needs stringent evaluation to ensure benefits accrue to most marginalized groups of ASM

	access to training, legal support, assaying services, micro-finance facility and a workshop for equipment maintenance are hosted.		• Capacitates gold mining and provides a channel for formal gold trading	
Claim Owner Financing Engagement Strategy	Formalizes the Claim Owner – Sponsor – ASM arrangement by providing attractive financial options to claim-owners who are seeking financing.	SSM	• Aims to curb 'sponsorship' which is a root cause for informal gold flow • Potential to leverage on the existing Mining Investment Loan Fund	• Needs stringent planning to ensure sustainability of financing
Syndication	Capacitating groupings of ASM miners to begin the process of formalization and access to finance & training.	ASM	• Targets most marginalized groups of ASM • Meets a Zim-ASSET target (500 syndicates)	• Some of the target population is highly mobile

List of Acronyms

COMZ	-	Chamber of Mines Zimbabwe
DfID	-	UK Department for International Development
EMA	-	Environmental Management Agency
FPR	-	Fidelity Printers and Refinery
GIZ	-	German Federal Enterprise for International Cooperation
GMMDT	-	Gold Mining and Minerals Development Trust
MAB	-	Mining Affairs Board
MEWC	-	Ministry of Environment Water and Climate
MHCW	-	Ministry of Health and Child Welfare
MMA	-	Mines and Minerals Act
MMMD	-	Ministry of Mines and Mining Development
MMMD	-	Ministry of Mines and Minerals Development
MOD	-	Ministry of Defence
MOF	-	Ministry of Finance and Economic Development
MOLG	-	Ministry of Local Government
MRCZ	-	Medical Research Council of Zimbabwe
NAC	-	National Aids Council
NGO	-	Non-Governmental Organization
NRB	-	Natural Resources Board
RBZ	-	Reserve Bank of Zimbabwe
RDC	-	Rural District Council
USAID	-	United States Agency for International Development
ZINWA	-	Zimbabwe National Water Authority
ZMF	-	Zimbabwe Miners Federation
ZNA	-	Zimbabwe National Army

Gold prices can be found at http://goldprice.org/

The table below shows how to convert between grams and ounces for gold.

1 gram (g) of gold	**=**	**0.03215 ounce (oz) of gold**
I ounce (oz) of gold	=	31.1 grams (g) of gold

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Chapter 1: Introduction

This is a report presenting and analysing the results of a scoping study and baseline survey conducted on ASM gold mining and trading in Zimbabwe between September and December 2014 by Pact. The results of this scoping study will be utilized to plan an intervention to contribute to the formalization of Zimbabwe's ASM sector.

Pact's consultations with Zimbabwean civil society, private sector mining companies, financiers, banks, and multi- and bilateral donors and the Government indicate that there is a clear appetite at many levels to find concrete ways to move towards full inclusion of ASM as a legitimate part of the spectrum of mining activity in Zimbabwe. Indications are that initiatives that focus on formalization of ASM gold mining and trading will have the requisite levels of political support. Specifically, the priority of Government is to bring ASM into the mainstream supply chain to capture more of the value of the gold and other minerals which are currently leaving the country illegally. In doing so, they have set a target of formalizing 100,000 miners. This is a Government-set target and is an ambitious number.

1.1 Background

ASM is estimated to provide a direct livelihood for more than one million people in Zimbabwe and presumed to support several million dependents, thus it is an extremely important income opportunity in a country which has high unemployment. Artisanal and small-scale miners produce minerals including gold, chrome, copper, tantalite and diamonds, and these are sold to local, regional, and international markets. Since January 2014, ASM has been decriminalized in Zimbabwe and it has become a priority focus area for Government in terms of formalizing the sector and attracting gold flows into legal trading channels. There is a consensus amongst mining stakeholders that the decriminalization of ASM signals a fundamental turning point in national policy and has created both an immediate need and an important opportunity to formalize the ASM sector.

Furthermore, the Government's 5-year economic blueprint, 'Zim-Asset' (Zimbabwe Agenda for Sustainable Socio-Economic Transformation)[1], identifies a number of policy goals that, if effectively implemented, could potentially produce additional synergies, generate more political 'buy-in' to proposed reforms, and contribute to the success of the pilot program.

1.2. Statement of the problem

ASM is typically a labour intensive sector that also provides more employment than LSM and is a key factor for many countries in relation to rural development[2]. It is for this reason that the United Nations (UN) has emphasized that the strategies for ASM should be rooted in rural development plans as the sector has been seen to both alleviate and exacerbate poverty. This is quite complex and dynamic and also there is a correlation between the human development index (HDI) position of countries and the

[1] *Zim-Asset was crafted to achieve sustainable development and social equity anchored on indigenization, empowerment and employment creation which will be largely propelled by the judicious exploitation of the country's abundant human and natural resources. This Results Based Agenda is built around four strategic clusters that will enable Zimbabwe to achieve economic growth and reposition the country as one of the strongest economies in the region and Africa. The four strategic clusters identified are: Food Security and Nutrition; Social Services and Poverty Eradication; Infrastructure and Utilities; and Value Addition and Beneficiation.*

[2] *African Union 2008, United Nations Economic Commission for Africa 2009*

proportion of the total workforce involved in ASM[3]. Simply put, it means the number of ASM is directly proportional to the level of poverty in a country.

The ASM sector is challenged by many factors that contribute to low productivity and enhance the vicious cycle of poverty among miners. Hentschel, Hruschka and Priester (2003) have articulated those challenges as common global attributes amongst ASM and these are:

[3] *(Hoadley & Limpitlaw, 2004)*

Attribute	ASM 'common' attributes
Geological	Lack of appropriate ore bodies; Lack of information about these ore bodies
Technical	Use of labour intensive proceses; Time consuming, wasteful and inefficient processes; Lack of access to low-cost appropriate technology
Legal	Discouraging investment climate; Illegality of ASM; Lack of social security; Contradictions between different legal acts and instruments
Human resources	Unskilled labour force; Use of child labour; Lack of written contracts; Poor health and safety standards and dangerous practices; Social dependencies; Bad social image of mining; Subsistence economy; Lack of knowledge on economic principles, credits and finances; Gambler mentality
Marketing	Access to the market only via intermediates; Market barriers and regulations; Low bargaining power for miners who are 'price takers'
Financial	Difficulties in low-cost preparation of feasibility-studies; Uneconomical investment decisions; Lack of book-keeping and financial management of operations; Fluctuating mineral prices and commodity demands
Organizational	Lack of representative organizations; Seasonal activity of ASM; Coordination or cooperation difficult because of geographical spread and remoteness of mines
Gender	Marginalization of women who are discriminated in terms of access to resources, roles, prices, etc. ; Women may be victims of targeted arrests by police and harassment by male counterparts including gold dealers in the sector
Environmental	Air and water pollution; Soil erosion; Destruction of agricultural land; Deforestation for timbers for mines and charcoal; Lack of rehabilitation after mining activities; Mercury and cyanide contamination

These challenges abound in Zimbabwe's ASM sector which is largely informal with poor working conditions.

1.3. Survey aim and objectives

The aim of the scoping study is to establish an understanding of the ASM gold mining and trading environment in Zimbabwe.

The objectives of the scoping phase are to:

- Understand and map the actors, production levels, mineral flows, economics, constraints, and political economy of gold;
- Identify opportunities for intervention(s) to formalize production and trade of ASM-produced gold;
- Assess prospects for policy reforms to support formalization of artisanal and small scale miners;
- Fully understand the challenges to, and opportunities for, any pilot program, what will be the key roadblocks, what will need to be in place for this to be successful initially and over time, and how to manage and interact with influential stakeholder groups;
- Develop a framework for the mining sector that facilitates and fosters cooperation between different scales of mining and a positive policy and economic context that promotes and incentivizes legal mining, processing and mineral trading; and
- Develop plans to integrate small scale and industrial mining in productive relationships.

1.4. Key questions

The scoping study therefore sought to answer the following questions:

- What is the historical background of ASM gold in Zimbabwe in terms of enablers and hindrances for improving the sector?
- Who are the key players in Zimbabwe ASM gold and what roles do they play?
- What is an estimated quality and quantity of gold produced by ASM in Midlands's province?
- What are the gaps and opportunities for a viable and formalized ASM gold sector in Zimbabwe?
- What is the legal and policy environment for ASM in Zimbabwe?
- What is needed for ASM gold mining and trading in Zimbabwe to be better, safer, more productive (efficient and effective) and to deliver sustainable benefits?

1.5. Field Research Methodology

1.5.1. Survey design

The baseline survey was a mixed methods study that used both qualitative and quantitative methods of data collection. The quantitative data was collected through individual questionnaires that were administered using cutting-edge, mobile technology that ensured data quality and real-time availability. The qualitative methods applied an interpretive approach to assist in understanding ASM in Zimbabwe. Data and methods triangulation was used to ensure corroboration of information being presented. This was done by the use of multiple data sources and data collection methods in gathering the information to help gain in-depth exploration and understanding of perceptions, trends and dynamics within and among various ASM gold mining stakeholders.

1.5.2. Respondent and Site Selection criteria

The survey sites for this baseline study were Kadoma and Shurugwi districts in the Mashonaland West and Midlands provinces respectively. The baseline survey interviewed a range of stakeholders including artisanal miners (men, women, and youth), small scale miners, large scale miners, mine owners/ operators, millers, traders, Government officials from mining, health workers, teachers and environment regulatory authorities. Other stakeholders that were interviewed were miners associations, CSOs (Civil Society Organisations)working in gold mining sector, the police and relevant training and research institutions staff.

The baseline survey also identified and interviewed respondents from neighbouring, non-mining communities. This group of respondents was a control for the purpose of comparing the socio-economic status of mining in relation to other alternative livelihoods within the communities. Efforts were made as far as possible to identify a control group from communities whose livelihoods were independent of gold mining/ trading.

Figure 1: Data Collector interviewing a group of miners

1.5.3. Sampling method

The sample for the ASM Social economic baseline survey was 1,174 respondents for the quantitative data collection and 34 for qualitative data collection.

Calculating Sample size

In determining the sample size, the baseline survey used the following sampling formula;

$s = X^2NP\ (1- P) \div d^2\ (N -1) + X^2P\ (1- P)$.

Where:

- s = required sample size;
- X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841);
- N = the population size;
- P = the population proportion (assumed to be 0.5 since this would provide the maximum sample size); and
- d = the degree of accuracy expressed as a proportion (0.05).

The sample distribution was as shown below;

Respondent group	Estimated population	Proposed Sample size (95% CI)	Actual Sample size (95% CI)	Response rate
Miners	500,000	384	354	92%
Control population	500,000	384	275	72%
Millers / traders	200	132	47	36%
Government Officials	500	218	75	34%
TOTAL	**1,000,700**	**1,118**	**751**	**67%**

Sampling procedure

Selection of mining sites to visit was done by using simple random sampling method. In this method, a list of mining sites in Kadoma and Shurugwi were developed. Using the random sequence generator software,[4] a random sequence of number was generated corresponding to the total number of listed mining sites, the random numbers were assigned to the list of mining sites and then sorted in ascending order thus shuffling the list of mining sites. A cut off line was then drawn at 14 which was the desired maximum number of mining sites that was agreed upon by Pact and COMZ. All the mining sites that appeared above the cut-off line were visited for the baseline data collection.

At the mining sites, the baseline survey used systematic random sampling to identify the respondents. In this method of sampling, the data collection team first determined the total number of ASM miners/ millers in the selected mining sites through the available miners' information from associations/ mine owners. The determined number of miners/millers was divided by the sample size that was calculated by statistical procedures for a 95% confidence interval sampling as outlined above in order to obtain a sampling interval. Once the sampling interval for each mining site was determined, the team in collaboration with mine owners/operators identified a starting point in sampling and continued counting and identifying respondents based on the determined sampling interval.

1.5.4. Methods of data collection

The quantitative data collection

Structured questionnaires were used to determine mining methods, production levels, health and socio-economic status of miners. Moreover data on equipment and tools used in ASM, needs and

[4] *(www.random.org/sequencies)*

service availability, taxation and payments made in the ASM gold sector was collected through the questionnaire.

The questionnaires were administered using mobile technology. The technology uses mobile survey software and existing cellular networks to provide an electronic platform for data collection and allow for immediate data entry. Pact has extensive experience of using the technology in data collection. This technology has successfully been used before in an African context for research and program monitoring. In this technology, the questionnaire is uploaded into the mobile phone by using software developed by Mobenzi Researchers[5]. The project established a web-based system that allowed electronic surveys or questionnaires to be designed (on a word processor), sent to, and conducted on, standard mobile phones. As surveys were completed they were automatically uploaded to the host computer. Where there was no mobile network coverage, completed surveys were stored securely in the phone. Basic mobile phones can store up to 50 completed surveys – depending on the length of the survey. The completed stored surveys were automatically uploaded into the host server upon reaching areas with network coverage.

Figure 2: Data Collectors using mobile technology to collect quantitative data at an alluvial mining site in Kadoma

Five questionnaires were developed to collect data from miners, mine operators and millers. A household questionnaire was administered to miner and non-miner heads of households to help understand the knowledge, experiences, and skills in relation to the economic activities that respondents were engaged in. Other information in the household questionnaire included gold mining practice, membership of associations, mining methods, tools and equipment, production levels, income and expenditure in relation to the economic activities conducted, household economic and food security, and respondent's assessment of regulatory authorities. Other information was on child labour, occupational health and safety, as well as respondents' general well-being.

[5] *(www.mobenzi.com).*

Another questionnaire was administered to mine operators/ owners and millers. In this case, the questionnaire sought to collect information on mining practices, inputs, tools, equipment and materials used in mining, production levels, legal framework, tax and payments related to gold mining and trading, transportation routes, gold trading points, and political economy of gold. Needs, opportunities and recommendations for formalization of ASM gold mining were all explored through this questionnaire.

Qualitative data collection

Semi-structured Key Informant Interview (KII) guides and Focus Group Discussion (FGD) guides were used to explore the needs, trends, opportunities, challenges and interactions within ASM gold mining and trading. The survey collected information from 21 key informants and conducted a total of 8 FGDs. The respondents for the KII and FGD are as outlined in the table below:

Table 1: The respondents for the KII and FGD

Key informant interview participants	Focus groups discussions participants
• MMMD • COMZ • Zimbabwe miners associations • Zimbabwe millers associations • EMA • Zimbabwe Revenue Authority • Leaders of NGO/CSOs involved in gold sector • Zimbabwe School of Mining • Zimbabwe Institute of Mining Research • National Social Security Authority (NSSA) • Police • MOF • FPR • LSM	• Artisanal miners (women/men) • Parliamentary Portfolio on Mining and Energy • Millers and traders (women/men) • RDCs • Local / community health workers • School teachers • Traditional leaders

Most Significant Change Methodology

Given Zimbabwe's rich history in ASM development and the leadership role that it previously played for ASM across Africa, the team considered there was much to be learned from the people who had seen the growth and decline, the mainstreaming and the marginalization, of the sector over the years. In order to capture this wealth of information, the team employed the 'Most Significant Change' methodology.

The survey collected a total of 3 stories from a sample of artisanal miners, Government officials from regulatory and other monitoring agencies as well as from gold traders. Each participant was asked to describe their background and experience in the sector, the changes they have seen over the years, what they think were the key drivers of that change, what promoted or prevented progress and their vision for the future. Criteria for selection of the most significant change story tellers were:

- Artisanal miners who have been in the sector for a minimum of 20 years;
- Gold millers and traders who have been in the business for a minimum of 20 years; and
- Retired Government officials who served in the gold mining regulatory authorities for not less than 20 years.

1.5.5. Methods of data analysis

- Quantitative data analysis

The analysis of quantitative data was done through the SPSS v.20[6]. Prior to data analysis, the team downloaded the data from the Mobenzi platform into Excel format. The data was then imported into SPSS v.20. The imported data was cleaned by running frequencies of key variables to identify missing values arising from incomplete or erroneous entries and outliers. The outliers that were identified were cleaned by deletion or labelling as missing information. Where corrections could not be done in excel; replacement of missing values was done through transform function in SPSS to generate a series mean. The series mean was used to replace missing values.

Clean data was then analysed for frequencies, percentages and cross tabulations. Frequency tables and charts/ graphs are used to visualize the data in the report. Independent T-test was used to test the statistical differences observed in the dataset for some key variables of interest. Moreover multiple regression analysis was done in selected variables to explore the relationships between the variables.

- Qualitative data analysis

MAXQDA v.11[7] was used to analyse qualitative data. Prior to analysis; the recorded data was transcribed from audio to text then translated from Shona to English language (where appropriate). The transcriptions were then read through for general understanding of ideas, impression of depth, credibility and use of information collected. The issues of interest and emerging ideas were noted as the reading continued. After the understanding of the broader content, the transcribed word documents were imported into MAXQDA v.11 for coding. A series of codes were developed based on the categories and themes from the interview guides. Additional codes were added as they emerged during the coding of interviews.

Once the codes were done; frequencies of codes were generated and exported to excel. The coded segments were then combined as per parent codes (themes). The themes informed the interpretation of data/information. The interpretation was also guided by comparison of findings with existing literature to bring out divergence or concurrence with existing knowledge. The code book was developed charting out the codes, brief description of the codes, frequency of occurrence as well as reference (where the code were found) in the raw data.

1.5.6. Data quality assurance

The mobile technology used for data collection has in-built features for limiting data errors and ensuring data quality. These include in-built skip logics that allow respondents to only respond to relevant questions and restrictions for text/ numbers as relevant i.e. a data collector could not wrongly

[6] *Data analysis software*

[7] *Data analysis software*

enter text in place of numbers or vice versa. The software also limits incomplete entries by restricting data collector from skipping questions which are either pre-marked as mandatory or do not have skip logics. This means the data collector had to ensure each question is responded to before moving to the next question.

All data collectors were assigned unique identifier codes for easy tracking and correction of data errors. All data were subjected to random data checking for quality assurance on a regular basis by Data Manager and project M&E (Monitoring and Evaluating) officer throughout the data collection exercise. The mobile technology used also allowed for instant communication with data collectors via SMS messages from the central computer in case data errors were noted to allow for prompt response to rectify the error while the team was still on the ground. Progress towards daily data collection targets were shared with the team leaders in the field to ensure the team was up to the task.

Data was securely kept in the server. All survey data was encrypted maintaining the confidentiality of responses and data security. Access to the web-interface was protected by passwords and firewall. Furthermore the completed questionnaire could not be accessed or retrieved on the phone. This is a feature that allowed for data securing in case a phone was stolen.

The audio qualitative information was securely kept under the supervision of the Scoping Study lead and only be accessed by authorized personnel for the purpose of this baseline survey. The audio was deleted immediately after the final report was written and disseminated. The transcribed data was however kept for the project records. Names of respondents were not attached to any of the datasets.

1.5.7. Data validation

The findings of the survey were subjected to review by survey respondents and mining stakeholders to validate the reported results and professional peer review through the Zimbabwe Institute of Mining research to ensure feedback on analysis and interpretation of results to avoid errors/ misrepresentation/ misinterpretation of information for improving the quality of report. Validation took place in January 2015 in Shurugwi and Kadoma.

1.5.8. Ethical considerations

Research ethical concerns are divided into relationship between science and society, professional issues as well as treatment of research participants.[8] While there are specific guidelines for conducting a scientific/empirical research in social sciences, care must be taken to ensure the scientific inquiry does not negatively impact on the research subjects, to protect the intellectual property rights of researchers, as well as to promote innovation and knowledge advancement. The dilemma in social science research lies in balancing scientific methods of collecting empirical evidence and minimizing potential risks/potential harm to survey participants.[9]

In undertaking this baseline survey, a great deal of ethical practice was considered in protecting the rights of survey participants as well as undertaking a scientific inquiry. This baseline survey observed the following ethical considerations:

- **Ethical clearance**

[8] *(Christensen et. al, 2011)*

[9] *(Creswell, 2009).*

The survey tools and protocols were submitted to the MRCZ for the professional peer review to ensure that the survey would not in any way cause harm/ risks to participants as well as ensuring intellectual property rights and promotion of innovations were addressed. Once the MRCZ cleared/approved the protocols and survey tools; the field data collection commenced.

- **Non- coercion of respondents and informed consent**

  Voluntary participation of survey respondents with no consequences for refusal to take part in the study was paramount in this survey. Upon advice from the MRCZ, hard copy informed consent forms were not solicited for quantitative survey participants. However informed consent was sought verbally and affirmations recorded in the mobile technology for an interview to continue. Where consent was not given, the mobile technology allowed for the survey to close instantly.

- **Confidentiality of participants' information**

  Participants were given assurance that all information collected would be kept securely and used for the sole purpose of the baseline survey. When a direct quote was made from the data collected, no name was mentioned in relation to the quote. Thus quotations were made on anonymous basis. Participants were assured that the recorded conversation between the data collectors and respondents would be deleted as soon as the information was written into a final report and that the discussion notes would henceforth be stored as electronic written notes; no voice recording would be kept after the final report was written and disseminated.

- **Non-judgment and respect for human dignity**

  The data collection and survey team at all times sought to maintain a non-judgmental attitude towards survey respondents. The baseline survey sought to limit prejudice, understand the ASM gold mining and trading industry, and interpret results with a balanced view that maintained the respect and dignity of respondents even when the views of data collectors/ survey team differed from those of respondents. To that end, data collectors were trained to ensure they refrained from making personal observations on information that respondents were providing.

- **Child protection**

  Pact works to promote the well-being of children and thus, to the best extent possible, Pact staff, partners, vendors and contractors are required to adhere to the organization's child protection principles and at all times safeguard the well-being of children. The baseline survey did not seek to interview children in the data collection process. This is because children are usually categorized as 'vulnerable' when it comes to research with human subjects due to their level of immaturity and inability to wilfully participate in data collection. This was in no way to underplay issues of child labour/presence of children in mining sites. Rather, the survey team sought to solicit information on children in mining through other methods of observation and triangulation rather than direct responses from children. All data collectors and survey team members were trained on child protection and required to sign Pact's child protection policy prior to engaging in field work.

- **Training of data collectors**

  Prior to commencement of data collection, all data collectors received training on research ethics to ensure that ethical procedures were adhered to throughout the data collection

process. The training drew lessons from the Belmont report '*Ethical Principles and Guidelines for Protection of Human Subjects of Research.*' Lessons were also drawn from guidelines from research ethics committees particularly the National Research Council of Zimbabwe. Safety and security in mining sites was also covered in the training to ensure that at all times the data collectors were able to assess the risks and prevent likelihood of injury/harm to self or survey respondents.

1.5.9. Dissemination of results

The results of the ASM baseline survey were first disseminated to the key stakeholders in the ASM gold sector in Zimbabwe. Artisanal miners, millers, traders and regulatory authorities in Midlands province were given an opportunity to hear the results at meetings where they were requested to validate the findings as an accurate reflection of issues they were facing and information they provided. This was done before the findings were shared with other stakeholders.

Further dissemination meetings were then held in Midlands and Harare where stakeholders were presented with the findings of the baseline study. The report was also provided to the Government of Zimbabwe notably the MRCZ and the MMMD for their consideration of the findings and recommendations for action and, where possible, their collaboration in operationalization of the recommended actions. The dissemination to various interested partied was done for wider information sharing and addition to existing body of knowledge. Pact and COMZ will seek to disseminate the findings of this survey in international fora to the mining industry. This will include peer reviewed publications and conferences as appropriate.

1.5.10. Survey limitations

The quantitative data collection only focused on the Midlands and Mashonaland West provinces and particularly Kadoma and Shurugwi mining districts as per the advice of COMZ As the survey team was only able to visit a selection of sites (not covering every mining site in the province) a major effort was made to ensure good representation in the sampling for extrapolation of results.

Despite the fact that the survey team had ethical clearance for the survey as well as letter of support from the Permanent Secretary of MMMD; the team faced some local administrative challenges, particularly in Kadoma District, that limited the team's ability to collect optimum data as per proposed samples within the timeframe of data collection.

Chapter 2: Conceptual Framework

2.1. Technical Background

The field work for the project was carried out in the Midlands and Mashonaland West Provinces, which were suggested by COMZ as potential pilot areas based on the concentration of ASM miners, presence of member companies, and relatively easy access from Harare.

The highest density of LSM--ASM gold mines are concentrated in these two provinces where the greenstone belts[10] shown on the geological map of Zimbabwe (in the figure below) are wide spread geospatially, composing 35% of all greenstone belts in the country. Consequently most of the gold produced in the country specifically from ASM operations is envisaged to come from Kadoma, Kwekwe and Shurugwi and these were the focus areas for the project's field activities.

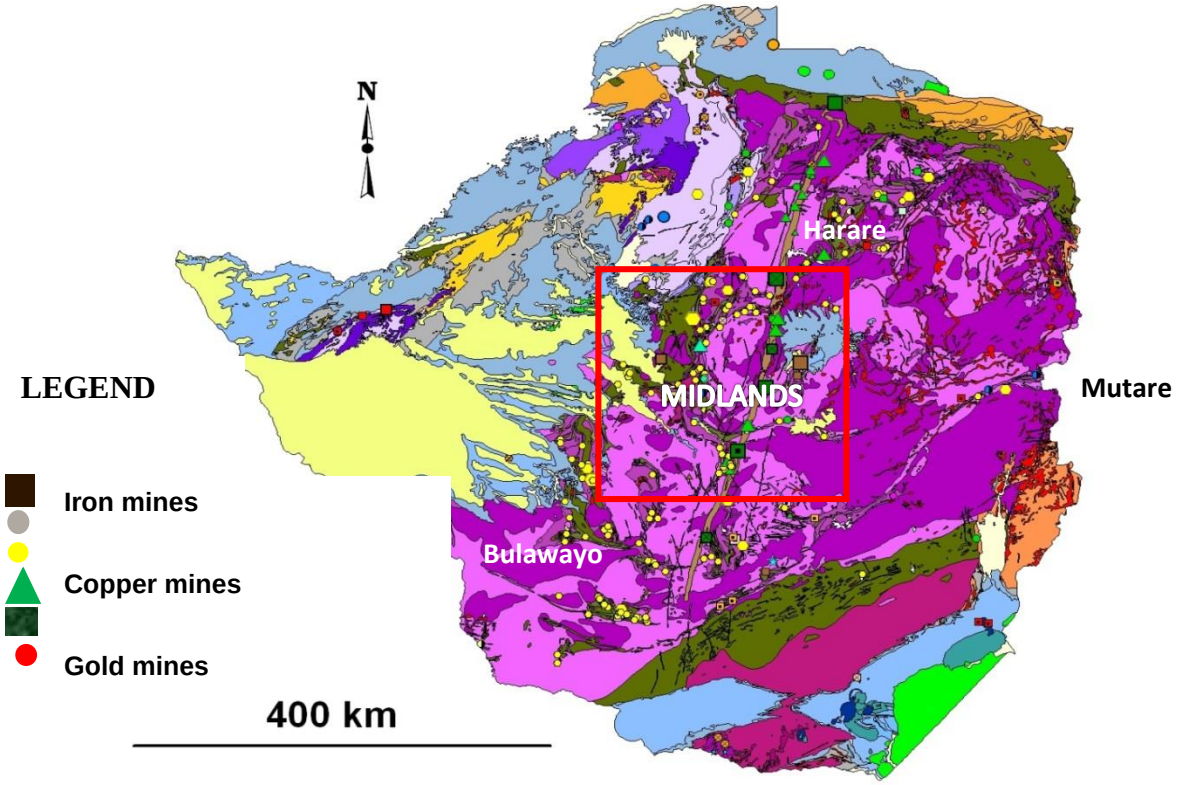

Figure 3: Geological Map of Zimbabwe

[10] *Geological formations comprising of greenstone rock which often contains gold*

The geology and mineralisation of gold in Zimbabwe

Most of the gold mined in Zimbabwe is from the Zimbabwean Archean Craton forming the central plateau of the country. The Craton consists of greenstone belts, granites and granitic gniesses. The greenstone belts host the majority of gold deposits in the country. Minor quantities have also been obtained from the younger, Proterozoic rocks. Gold is basically found in two types of environments: in-situ rock, here referred to as bedrock deposits (i.e. hard rock), and alluvial deposits in streams and rivers which are fine gold nuggets and dust which have been weathered and eroded from primary sources (bedrock deposits). Mineralisation of the bedrock gold deposits are further classified into two categories: strata bound and non-strata bound.

The strata bound type includes deposits hosted in iron formation, mineralisation in banded sulphides and deposits in volcanoclastic and clastic formations. Non strata type constitute mineralisation hosted in veins and shear zone. Vein type gold deposits consist of quartz, carbonates and minor sulphides. Pyrite is ubiquitous and chalcopyrite is relatively widespread. Arsenopyrite is common in veins hosted by mafic rocks but are in granitic terrains, similarly pyrrhotite is more relevant in mafic rocks. The map below shows the geological map of Zimbabwe.

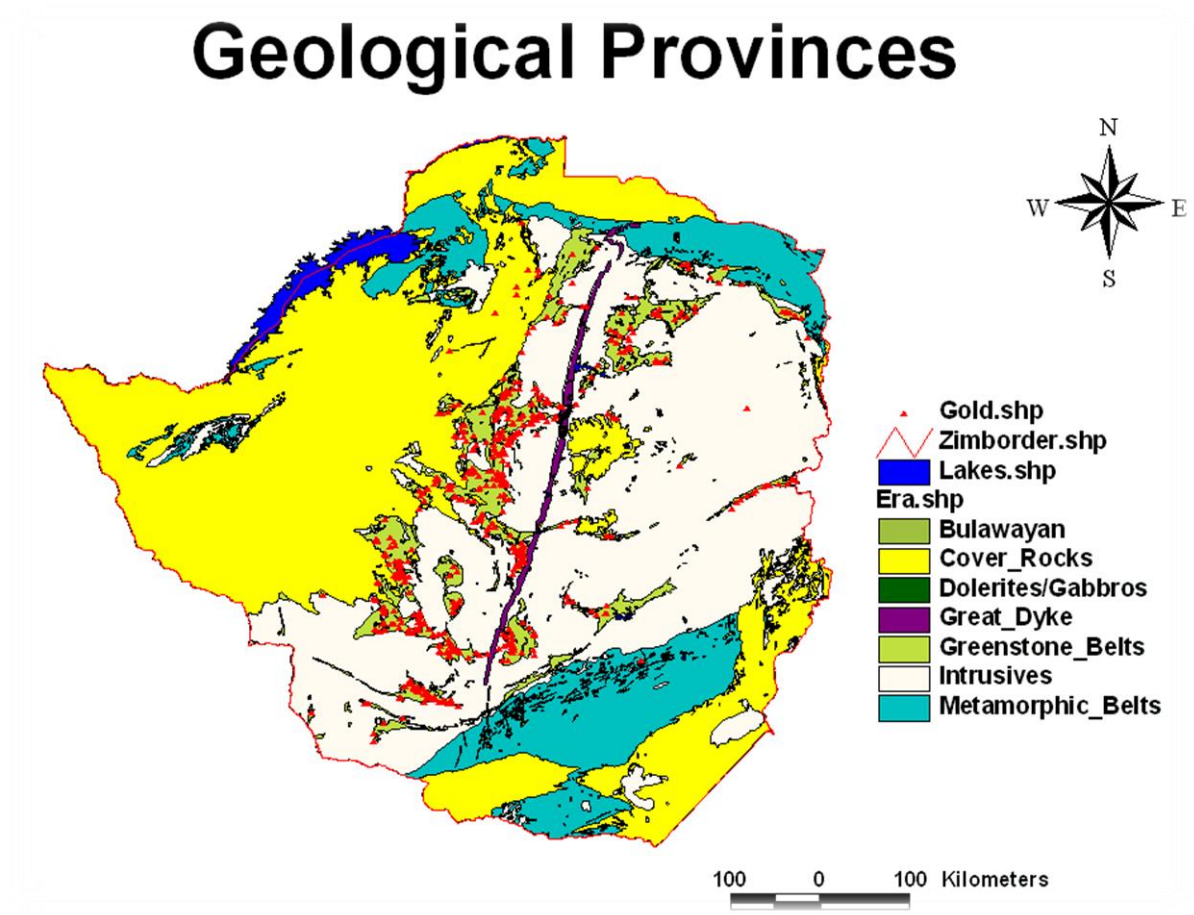

Figure 4: Geological provinces map showing gold occurrences on the Archaean greenstone terrain

The Archaean greenstone belts or geological formations not only host gold and silver but also considerable resources of iron ore, nickel, copper, cobalt and podiform chromite, also chrysolite asbestos (Mashaba Igneous Complex), limestone, pyrite and antimony as well.

2.2. Historical Background

Artisanal mining has been reported as being in place for hundreds of years in Zimbabwe, since pre-colonial times[11]. Miners still rely on many of the simple ore extraction methods that were used by these pre-colonial indigenous and early colonial miners.[12] At the beginning of the 20th century, the majority of mining activities were carried out at a manual or artisanal level. As late as 1908, over 70% of the country's mines were still classified as 'small workings'.[13] However by 1988 only 20% of the

[11] *(Masiya, Mlambo, & Mungoni, 2012)*

[12] *(Phimister, 1975).*

[13] *(Hollaway, 2000)*

country's gold mines were classified as small, based on tonnage of ore (0-50 000 tonnes of ore per year).[14]

This downward trend in numbers of small miners was, however, reversed in the 1990s and 2000s. This was caused by the downscaling of LSM activities due to the fall in gold prices, the collapse of the agricultural sector due to drought and the implementation of the land reform program, and the layoff of public sector workers during structural adjustment programs.[15]

The inverse relationship between rise in ASM and decline in the economy is well articulated by Hollaway who states: *"The [ASM] sector has grown in leaps and bounds during the last 20 years [1980 – 2000], fuelled by many factors including the economic decline that led to high unemployment as a result of retrenchments and drought during the 1980s. Prior to the droughts of the 1980s and that of the early 1990s, panning[16] was primarily a dry-season activity. The upsurge in gold panning during the 1982, 1992 and 1994 agricultural seasons is directly attributable to drought."*[17].

In 1993, a UN conference on ASM was held in Harare where the 'Harare Guidelines on Small-Scale Mining'[18] were promulgated. These became an exemplary illustration of forward-thinking governmental approaches for poverty-reduction-oriented development assistance for ASM workers. These guidelines have been heralded as a useful model around the world and referenced in literature on ASM across Africa[19].

2.2.1. Government Interventions

During the 90s and up until 2006, the government formulated several interventions to support ASM activities and improve their gold delivery to FPR. These interventions include: gold price stabilization, establishing the Gold Mining and Minerals Development Trust (GMMDT), *Operation Chikorokoza Chapera* and the Mining Investment Loan Fund.

- Gold Pricing

At various points in the early 1990s, the Government of Zimbabwe kept gold prices for small-scale miners at favourable rates to minimise smuggling, which created incentives for miner legalisation and registration. In fact, the Government even had a special 'support price' for gold that small-scale miners sold to the Reserve Bank of Zimbabwe (RBZ) in the 1990s, which was at certain times higher than international market prices[20]. This pricing policy was devised both to encourage industry growth and to increase government gold collection.[21]

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[14] *(Maponga, 1993)*

[15] *(Global Mercury Project, 2007)*

[16] *In Zimbabwe, "panning" refers not just to the physical activity of panning (filtering gold from sands by using a pan and water) but also to the process of disrupting riverbanks and riverbeds with shovels and other methods.*

[17] *(Hollaway, 2000)*

[18] *http://onlinelibrary.wiley.com/doi/10.1111/j.1477-8947.1994.tb00868.x/abstract*

[19] *(Hinton J. , 2006)*

[20] *Due to the RBZ's discretion at the time, with fixing exchange rates it was able to buy gold in local currency at prices that seemed to be above international prices when in fact the local currency was over-valued (Masiiwa, 2014) (Masiiwa, 2014) (Masiiwa, 2014)*

[21] *(Drechsler, 2001)*

- Gold Mining and Minerals Development Trust (GMMDT)

The GMMDT was a trust launched by the RBZ in 2001 as a tool to improve gold production and stem leakages (i.e., smuggling). The GMMDT was established with the vision that it would lend to gold miners, promote environmentally friendly mining methods and assist with environmental rehabilitation, advocate for balanced mining legislation and finance the establishment of milling centres. The GMMDT was supported by the President.

When the Gold Trade (Gold Buying Permits for Concession Areas) regulations were enacted the following year, GMMDT was granted four gold-buying concession permits in Harare, Bulawayo, Kwekwe and Mutare mining districts. This became the core business of GMMDT despite gold buying never having been an objective of the trust at its establishment. The GMMDT and other permit holders were the main reason for the peak in ASM gold delivery to FPR in 2004[22]. The GMMDT was abruptly dissolved by Dr Gideon Gono when he became the Reserve Bank Governor. The Gold Trade regulations were also repealed.This policy ended with a shift to a near-opposite approach, which is described below.

- *Operation Chikorokoza Chapera*

By 2006 Zimbabwe was deep into a recession epitomized by hyperinflation, high unemployment, poor agricultural conditions and political instability. Mining had remained one of the few viable industries in the country and faced an unprecedented set of pressures to contribute more to the fiscus and GDP. The RBZ insisted that gold miners sell their gold to the FPR at a tiny fraction of the actual international gold price, sometimes even as little as one thirtieth (1/30) of the equivalent international price when calculated at black market exchange rates[23]. As a result most of the ASM produced gold was being traded on the informal market.

The Government criminalized ASM by repealing SI 275/1991 (discussed in section 2.6.1.) and put up requirements that all toll elution[24] operators be registered. In order to enforce these policy changes the government launched a nationwide crackdown against ASM miners and gold traders during the week before Christmas in 2006.[25] Interestingly; this was also a time when gold prices were climbing internationally and December is traditionally the month when ASM gold production peaks.

The police confiscated gold, ore and equipment while bulldozing what were arbitrarily deemed sub-standard workers' housing and, in the process, destroying or confiscating their meagre household possessions. The crackdown which was code-named '*Operation Chikorokoza Chapera'*[26], suppressed virtually all ASM operations and led to the arrest of at least 32,000 miners within the first few months of 2007.

To justify the crackdown the RBZ had estimated that about USD50 to 60 million of gold was being smuggled out of the country per month. One key informant alleged that the Governor had arrived at this figure after being misinformed by an overzealous individual seeking a gold buying licence that

[22] *(Singo, 2014)*

[23] *(Spiegel, 2012).*

[24] *Toll elution is the process of recovering gold from the carbon used during cyanidation.*

[25] *This was at a time when the price of gold was rising. The recent boom in the gold price occurred while artisanal mining was criminalized.*

[26] *Chikorokoza Chapera is a Shona phrase that means Artisanal Mining is Over*

there were 1.5 million artisanal and small-scale miners in Zimbabwe, each of whom recovered 5grams of gold a day.

The RBZ through its subsidiary, Carslone Corporation, confiscated stockpiles of ore from ASM operators and set up mills to process the gold. The miners were never compensated for the gold that was recovered. These mills are now defunct.[27]

The immediate implications of *Operation Chikorokoza Chapera* included an increase in unemployment, an escalation in crime, night-time ASM activities, riverbed gold panners turned to hard-rock reef mining in remote forest areas to evade the police, and some miners were imprisoned for as long as five years for illegal possession of gold.

Dr Sam Spiegel[28] explains the three long-term implications of Operation *Chikorokoza Chapera* as:

- Environmental Impact Assessments as a barrier to livelihood formalisation:

The environmental degradation caused by ASM operations was a key rationale for the crackdown. After the enactment of the Environmental Management Act in 2002, government imposed a uniform Environmental Impact Assessment (EIA) for all mining operations regardless of their scale. This was fiercely contested by members of the Zimbabwe Miners Federation (ZMF) and the Zimbabwe Panners Association (ZPA) to no avail. To resume operations after the crackdown, miners had to complete the EIA requirements. The uniform set of EIA requirements meant that a consultancy report had to be paid for to meet all the EIA stipulations and this cost on average 4,000 US dollars, and a further amount that artisanal and small-scale miners also had to pay to the government. This effectively made EIAs a barrier to entry to ASM.

- Increased inequality in accessing licences:

Some artisanal miners were not licenced but depended on a relationship of trust with registered gold millers. These relationships were however compromised by the crackdown. Though many miners were willing to become registered the government hiked the registration fees thereby making it almost impossible for artisanal miners to operate legally.

- No foreign donor support and no rural governance support:

While there had been many donor-funded projects to support ASM in the 1990s, the criminalization of ASM prevented this support from continuing. From 2006 to date, RDCs have not received support from donor agencies or central government for regulating and managing risks associated with ASM. Civil society still reports being hesitant to engage due to the once hot-button topic of mining.

At a Senate Hearing in September 2007, the then Minister of Mines and Minerals Development, Hon. Amos Midzi, distanced himself from Operation *Chikorokoza Chapera*. He stated. *"The issue of makorokoza[29] lies on the RBZ because it has the responsibility at the end of the day of determining prices…If you look at the issue that illegal gold miners have not yet stopped, illegal gold panners will not stop [and] we cannot stop illegal gold mining"*[30].

The use of command and control instruments in environmental management is easier for Government to administer compared with other approaches such as the use of economic incentives.[31] Although at

[27] *(Global Mercury Project, 2007)*

[28] *(Dr Sam Spiegel, 2012)*

[29] *Artisanal miners*

[30] *(Parliament of Zimbabwe, 2007)*

[31] *(Noetstaller R.: 2002)*

times limited by a poor administrative base, this approach provides a basis for enforcement through the prosecution of violators of regulations. While Operation *Chikorokoza Chapera* was effective in stamping out illegal mining through the use of force, it totally failed to bring about the meaningful change that Government envisioned: more legal operations whose output was channelled to FPR. The RBZ was, at the time, the most powerful Government institution in gold mining and trading and it was felt that it over-reached its mandate by pushing for Operation *Chikorokoza Chapera.* With little support from the MMMD and almost no participation from the MEWC, the Operation was not well thought out and failed to achieve its stated objectives. The ASM criminalization policy was reversed in December 2013 because government had realised it could not stop ASM and, due to the very criminality imposed by the law, the gold produced in ASM could not be sold to FPR. The policy had unintentionally incentivized the informal trade in gold which it had sought to stop.

- Mining Investment Loan Fund (MIL Fund)

The MMMD created the MIL Fund which was made available to small-scale miners. MIL Fund was set up to offer a variety of cash loans for developing small-scale mines, purchasing equipment and other types of loans tailored for small-scale miners. At the time of its establishment MIL Fund stood out as a rare example of a loans facility that could integrate sector-specific training and credit delivery to miners. It was heralded as a facility that other African countries would be well advised to explore ways of emulating.

However the Fund, which was administered by the Mining Affairs Board (MAB), was crippled by hyperinflation and amounted to around Zim$2 million[32] in 2006, a paltry amount which was just adequate to capitalise four mines at Zim$500,000 each. Accusations of corruption within the MIL Fund programme also intensified in 2006.[33]

- Decriminalization

In December 2013, the Minister of Finance announced that ASM would be no longer a criminal activity from the 1st of January 2014. This was however only a policy statement and not backed by any legislation. On the ground there was a cessation in arrests of artisanal miners but an increased presence of security officials at major mining sites and all milling sites from July 2014. These security officials represent the Joint Operations Committee (JOC) – the army, air force, CIO and police. FPR has indicated that deliveries of gold have increased since the JOC deployment to mining and milling sites as miners are now afraid of selling their gold to the informal sector.

[32] *Approximately USD19,800*

[33] *(Spiegel, 2012)*

2.2.2. Development Projects

Promulgation of SI 275/1991 created a space for mining-oriented development linkages in the '90s. Some of the development projects that were conducted for ASM include:

- GTZ-funded rehabilitation pilot project

Following the enactment of SI 275/1991 there were several attempts by equipment manufacturers to make gravity separation equipment[34] that would be more appropriate to gold panning conditions. German Technical Cooperation (GTZ)[35] funded a project which was supervised by the University of Zimbabwe's Department of Mining Engineering to demonstrate the benefits of rehabilitating mined areas in small-scale gold mining regions and the use of sluice boxes[36]. The pilot project was undertaken on two sites in Zimbabwe, along the Manyuchi and Insiza rivers, and demonstrated that riverbank mining (as legislated in SI 275/1991) can be undertaken economically in an environmentally sustainable manner.

The *modus operandi* of the project was to use mined-out material from one section of the river bank to backfill another section. The miners were removing gold-barren topsoil and subsoil and then treating the underlying gold-bearing rubble horizon through sluice boxes. This rubble was then used to fill the base of the preceding pit followed by surface tailings, subsoil and topsoil. Re-vegetation would then naturally occur with the advent of the rains. Most importantly the project showed that repairing the river bank could be done at a cost covered by the value of the gold produced by panners.

The sluice boxes that were introduced achieved fairly high productivities of 4 tonnes per man-shift[37]. The main drawback however was that a minimum ore grade of 0.25g/t[38] was required to justify the capital investment which was between USD10,000 and USD15,000 per panning group of 20 people. However, leaving behind material with a grade of less than 0.25g/t would bring back illegal panners in the near future.

The rehabilitation pilot project showed that legally registered panners, when provided with the necessary capital, could rehabilitate mined areas and recover gold economically. However the viability of the rehabilitation depended on capital input to support the procurement of equipment.[39] There was no such capital injection from Government or the private sector.

The chief lesson from this site-specific intervention was that low cost technology that would enable even grades lower than 0.1g/t to be panned economically was required. The legal stipulation that riverbank mining could only be carried out down to 1.5 metres coupled with the high cut-off grade meant a lot of gold bearing ore would be left behind even after rehabilitation thereby encouraging illegal mining which would more often than not occur without rehabilitation.

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[34] *This is equipment that separates free gold from the rest of the ore by their relative movement in response to the force of gravity and one or more other forces (such as centrifugal forces, magnetic forces, buoyant forces). Due to gold's high specific density (it is very heavy) it is much more resistant to motion in a viscous medium such as heavy media, water or air.*

[35] *Now the GIZ*

[36] *Gravity based troughs which use water for concentrating gold from crushed gravel or sands.*

[37] *8 hours of one person's labour*

[38] *This is lower than the average grades in Zimbabwe*

[39] *(Maponga & Ngorima, 2003)*

- The Mining, Minerals and Sustainable Development (MMSD) Project

In 2000, the International Institute for Environment and Development (IIED) commissioned the Mining, Minerals and Sustainable Development (MMSD) project which was carried out between 2000 and 2002. The MMSD country research studies covered more than half of the worldwide ASM population. One major finding was that Zimbabwe together with Bolivia, Burkina Faso, Ghana, Mali, PNG and Tanzania were the countries where the ASM sector was socially and economically most important and where the largest percentage of the population was involved[40] though this neglected the Democratic Republic of Congo (DRC) which had an increasing dependence on ASM at this time. The Zimbabwean ASM activities were seen to be largely temporary and fuelled by economic recession. The study estimated that there were 350,000 artisanal miners, 153,000 of whom were women and children.

- Austrian Foundation for Small Mines (AFSM)

AFSM provided financial and technical assistance to miners. Initially the assistance was targeted at chromite miners but was later extended to gold producers. The attempt to provide soft loans and grants to small-scale miners was not successful due to three reasons:

- The requirements for loans were so complex and strict that an ordinary small-scale miner within the target group could not fulfil it;
- There were limited chances of getting any money back for redistribution; and
- The administrative and management costs associated with disbursement of the loans or grants were much higher than the capital provided.

As a result, setting up a sustainable revolving loan scheme failed.[41]

- Shamva Mining Centre

The Shamva Mining Centre (SMC) was developed as an idea by NGOO, Practical Action[42] and GTZ[43] in 1989 and further developed in the early 1990s. Practical Action partnered the MMMD and the Small-scale Miners Association of Zimbabwe (SSMAZ) in implementing the project. Donors that supported the project included GTZ, DfID and the European Union (EU). SNV of the Netherlands assisted in establishing Shamva Training School for women miners.

The objectives of the project were to:

- Provide a commercially viable and sustainable custom milling facility for small-scale gold Miners in the Shamva area and improve incomes of miners;
- Create jobs;
- Train miners in health, safety and sustainable mining methods; and

[40] *(Hentschel, Hruschka, & Priester, 2003)*

[41] *(Drechsler, 2001)*

[42] *At the term it was known as the Intermediate Technology Development Group (ITDG)*

[43] *Now GIZ*

- Share and disseminate lessons and experiences on the project locally and internationally.

A key concept of the SMC project was that central processing units could help bring illegal mining into a legal framework and create a more centralized, organised and easily regulated way of processing gold. It was believed that this could help control mercury usage and facilitate access to more advanced technology that would raise incomes.[44] Training was provided to small-scale miners to improve their skills in mining methods, geology, mine pegging[45], environmental management, health and safety, business planning and management.

The Shamva Mining Centre was, at the time of its construction, heralded by many as the most significant support service ever provided for small-scale mining to date.[46] As one of the most widely cited examples of an international donor-funded project to set up a gold-processing mill for ASM, Shamva was viewed by researchers initially as a proactive step towards improving environmental management and economic efficiency through technology-sharing.[47] The SMC was heralded as a 'best practice in small-scale mining' by the UN Economic Commission for Africa (UNECA) in 2002.

Key Success Factors

- The SMC project was successful because it addressed a real need of small-scale miners through improvement of their access to processing technology. Custom milling services provided at the centre made a difference to the livelihoods of artisanal and small-scale miners by increasing their incomes. Incomes initially rose by up to 30% in the early phase of SMC's operations;
- The RBZ had a presence at the SMC and the fees paid by miners to have their ore processed were directly related to the final price at which their gold was bought. This made the service affordable to miners while at the same time giving the SMC a profit; and
- In the initial stages there was collaboration from all key stakeholders.

Problems Encountered

There were multiple problems encountered in the execution of the SMC's development vision over the long term:

- Very high demand for the milling services:
  At its inception, the centre was expected to serve about 43 miners within a 50km radius of the centre. By 1995 however, the services provided at the centre had proved so effective and popular that more than 150 miners were using the centre.[48] The catchment area of the centre had extended to a radius of 200km. By the end of the decade the actual demand for the ore processing at the SMC had exceeded '500 small-scale operations'[49]. This led to waiting times

[44] *(Spiegel, 2012)*
[45] *Demarcating the boundaries of a mine claim*
[46] *(Hilson G. , 2007)*
[47] *(Svotwa & Bugnosen, 1993)*
[48] *(Drechsler, 2001)*
[49] *(Hilson G. , 2007)*

of up to six weeks to process ore. The failure to meet demand led to disappointment among miners and reversion to the amalgamation process which threatened human health and the environment. Hilson[50] argues that better initial research by the development agencies would have helped determine community-specific needs and thus avoid some problems like excessive demand. The executive committee that ran the mill after handover ultimately decided to set a minimum amount of ore that miners had to bring in order to be eligible to use the facility. Those bringing less than 10 tonnes of their ore could have their ore milled only during slack periods. This prevented poorer artisanal miners for whom the SMC was established from benefitting from the centre. The executive committee was composed of a group of 'established' small-scale miners who were 'not concerned' about poorer miners.[51] Over time this led to under-utilization and then abandonment;

- Lack of government support: The national government was blamed for insufficient support for the SMC project;[52]
- Hasty transfer of management: Some critics have pointed out that foreign donors and government actors were too quick to transfer the management of the milling centre to a local association of miners; and
- Poor business decisions.

This final point of poor business decisions made by the SSMAZ executive committee concerning the operations of the centre was the single biggest problem encountered at SMC. In January 1999, the committee decided that it had built sufficient capacity to run the centre without external assistance. No experienced and competent manager was appointed to take over from the Practical Action manager. By June 1999, the centre had run into serious cash flow problems. In January 2001 the committee decided to lease the centre to a local miner in Shamva.

The lessons and experiences SMC were widely shared and disseminated. This led to the replication of the model in other African countries with support from donors and international agencies like the World Bank. Similar centres have been created in other parts of Zimbabwe, Burkina Faso, Mali and Tanzania.

Lessons learnt

- Dreschler[53] argues that there is need for development agencies to rethink whether it is always necessary to hand over commercial projects to producers associations. Producers may well be better off to leave the management of commercial projects to experienced and qualified managers while they enjoy an efficient and competitively priced service;
- Great care has to be taken in working with associations to ensure that a few powerful people in the association do not monopolise benefits created for individual gain. Government agents, donors and foreign experts need to be more sensitive to complexities of miners' organisational structures in their programming;
- Technology unlocks the potential of small-scale miners to run viable mines. Access to processing facilities at SMC enabled miners to increase productivity and improve the viability of their mines until management problems emerged in January 1999; and

[50] *(Hilson 2007)*
[51] *(Spiegel, 2012)*
[52] *(Mugova, 2001)*
[53] *(Drechsler, 2001)*

- Small-scale miners, like any other entrepreneurs, require a complete package of business development services to thrive and grow. In addition to technology, they require skills in business planning and management, mining methods, sustainable environmental management and access to credit and profitable markets.

2.2.3. Private Sector Interventions

Bank Loans

Banks such as ZB (formerly Zimbank), Barclays and the Commercial Bank of Zimbabwe (CBZ) have offered loans to small-scale miners amounting to less than Zim$300,000[54] per miner, mainly due to the miners' minimal collateral. This was not enough to get a miner into production, contributing to a poor success rate for the loan schemes.[55]

Barclays Bank as a Gold Buyer (1980 – 1987)

Between 1980 and 1987, Barclays Bank was the sole buyer and exporter of gold in Zimbabwe. The Bank had a gold buying centre in Harare which was run by just four people. The Bank handled gold transactions of all amounts down to 5g (due to the efficacy of the Specific Gravity method). All that a miner needed was their claim registration in order to sell their gold and a significant portion of their clients were small-scale miners. The Bank stopped buying gold when its two senior employees of the gold buying unit left to start their own businesses which left a void in the unit.[56] For the next two years gold was shipped by the government to Australia for refining as South Africa was still under Apartheid government. This continued until FPR was set up in 1989.

Early co-existence

One major benefit of the legalisation of gold panning (SI 275/1991) was the creation of opportunities for co-existence between LSM and ASM. Some large mining houses realised the need for the integration of gold panners into their programmes so as to minimise environmental damage. This integration came in different forms:

- Education programmes to inform panners about better gold recovery methods and good environmental management.
- At Dalny Mine, panners signed an agreement with mine management giving panners access to claims owned by Dalny and allowing them to access water for panning from the mine's pipeline, thus improving productivity and ensuring that panning occurs at specific sites.
- At Redwing Mine in Penhalonga, panners were given permission to rework old dumps with the mine processing their concentrates to recover gold. This eliminated the need for mercury as the mine took responsibility for the marketing of the recovered gold and then deducted processing charges before paying the panners.
- At both Dalny and Redwing mines, management invested in educating the panners on the dangers of using mercury.

[54] *Approximately USD6,000*

[55] *(Drechsler, 2001)*

[56] *(Anonymous, 2014)*

ZimAlloys Scheme

During the late 1990s, ZimAlloys began a tributing system which had an exemplary environmental management system. In the ZimAlloys scheme, the company would deduct Zim$20 per tonne of chrome received from the supplier as an ‘‘environmental rehabilitation charge’. When the miner successfully rehabilitated the operation, he/she was then given back Zim$35 per tonne bought from him/her. A quick evaluation of this by Dreschler[57] shows that it would cost the miner about Zim$25 per tonne mined out to rehabilitate the mine. The same job would cost ZimAlloys Zim$50 per tonne mined. And so, by doing rehabilitation, the miner was gaining Zim$10 per tonne, and ZimAlloys was saving Zim$15 per tonne.

Farvic Mine Model

Farvic Mine is a gold mine located near West Nicholson in Matabeleland South. The mine had been defunct for 50 years and was taken over by Farvic Consolidated Mines (Pvt) Ltd in 2003. It is comprised of 260 claims of which only 10 are currently in use while the other 250 are under exploration. The company’s Managing Director, Harry Greaves, realized the need to assist artisanal and small-scale miners during *Operation Chikorokoza Chapera* where artisanal miners were viewed as the enemy and LSM provided the police with transport in order to arrest ASM. Farvic took a different approach:

- Met up with artisanal and small-scale miners to find out their needs which they found out be:
    - Access to good quality drinking water;
    - Access to geological services – company geologists provided free services to the miners. the company needed the geological information for its own planning purposes and thus it was a win-win situation;
    - Subsidised charges for use of the mine laboratory; and
    - Tribute agreements which allowed the miners to work legitimately and hold bullion. This tribute system allowed the miners to mine down to 50 metres below the surface.
- Helping miners to move vertically – Mr Greaves cited an example of one miner who managed to buy a pick-up truck from the proceeds of mining.
- Set up a stamp mill – the company set up a stamp mill which is freely accessible to the miners and handed it over to two managers who run it. However many miners still prefer to use other mills which offer equipment leases.

The objectives of the Farvic Model of integration with ASM are:

- To legitimise the small scale/artisanal mining sector; and
- Eradicate the use of mercury.

Mr Greaves believes the company has achieved only 5% of what could be done for ASM in the area. A key lesson, however, is that eradication of mercury use is a complex issue which will need multi-stakeholder engagement. The Farvic model has failed to address this yet but has the vision to come

[57] *(2001)*

up with a viable alternative way of winning the free gold from the concentrates. The Farvic model has been emulated by New Dawn mining in their integration project at Golden Quarry Mine.[58]

ZIMASCO

ZIMASCO is a chrome mining and smelting company that has operated tributes. The company employs contract managers who manage tribute holders and, in so doing, identify the miners working on high grade ore bodies whom the company can assist with equipment. ZIMASCO provides the transportation of the ore from mining sites to its processing plant and pays the tribute holders based on tonnage (of both ore and waste). ZIMASCO awards bonuses when a tributor delivers ore with a better grade than expected and charges a penalty for a lower grade than expected. The company leases out equipment for environmental rehabilitation.

The company used to purchase equipment and personal vehicles as part of its capital expenditure[59]. ZIMASCO prefers a tribute system because compliance with the MMA and statutory instruments is transferred to the tribute holder.[60] In the case of taxes and payments, ZIMASCO pays RDC levies, makes returns to the MMMD and pays royalty to ZIMRA. The tribute holder pays EMA fees, NSSA fees and presumptive tax to ZIMRA. ZIMASCO has encountered successes and challenges with the tribute system which include:

Challenges:

- EMA used to require one EIA for the entire ZIMASCO operation but they now require an EIA for each claim as this increases their revenue;
- Illegal trading in chrome: Chinese operators of local chrome smelters are buying chrome ore from ZIMASCO tribute holders. While they pay less than ZIMASCO, they pay in cash which the miners prefer; and
- Capacitating the miners - the company is currently not financially able to provide assistance to as many miners as it would want to.

Successes:

- Empowerment of indigenous Zimbabweans – this is conducted under the MMMD's syndication system where a maximum of six people can form a syndicate and are led by one representative (the staking agent);
- Community relations improve; and
- Maximization of mineral recovery due to different operating scales for differently graded ore-bodies.

Tetrad Bank as a Gold Buyer (2011 – 2013)

Tendai Biti, the then Minister of Finance, liberalized the gold buying sector in 2009 and, for the first time, anyone could buy gold and export it provided they obtained a gold buying licence and/or an export licence from the MOF. Tetrad Bank held a gold buying licence and set up gold buying units at its branches in Harare, Kadoma and Kwekwe. While the Kadoma branch was the first to be established, the Harare branch became the busiest as gold miners preferred to travel to Harare to sell their gold

[58] *(Greaves, 2014)*

[59]

[60] *(Employee at ZIMASCO, 2014)*

and then purchase inputs on the same trip. At its peak, in December 2011 the bank was buying over 50 kg of gold a month.

The bank bought a minimum of 10g and used specific gravity to ascertain the purity of the gold. Tetrad charged 8% tax on all gold that was remitted. In addition the bank collected, on behalf of ZIMRA, a 5% presumptive tax on unregistered miners or those without tax clearances. Tetrad initially bought gold at world price equivalent less 8% (or 13% for unregistered miners). Tetrad would then sell the gold to FPR at world price equivalent where it was refined. The price that Tetrad paid to miners was directly proportional to the quality of the gold i.e. 87% gold received a price of 87% of the price for 99.99% gold[61]. However FPR would hold onto the gold (and thus payment) for a week so to account for that risk the bank's financial analysts decided to use weekly fixes[62]. The Bank attempted unsuccessfully to obtain a gold exporting licence and even appealed the government's decision in court.

A former employee of Tetrad Bank estimated that miners were bringing, on average, 20% of their gold output to Tetrad Bank. This was in order to have a record of official gold sales and thereby "*avoid harassment from officials from the Criminal Investigation Department (CID), Environment Management Agency (EMA) and FPR*" when they conducted inspections. Towards the end of the gold buying business, Tetrad considered giving out loans based on the 'sponsorship'[63] model common in ASM in Zimbabwe.[64] Miners, however, cited that while Tetrad had no pricing advantage over FPR, it had a faster and more efficient service.

The Bank began its gold buying unit when gold prices where on an upward trend and it made money by speculating on the gold price. This model worked well until early 2013 when the gold price began a downward spiral which put the Bank's gold buying unit out of business by April 2013, months before the gold market liberalization was reversed by the Minister of Finance, Patrick Chinamasa in December 2013.

2.2.4. Most Significant Change Stories

Insights from the Most Significant Change stories are interspersed in the entirety of the report however in this section redacted versions of the top three stories are presented:

- Miner (from Chakari, Kadoma):

The miner said he started mining in 1990 and the sector was very good at that time. He has, however, seen many changes since then. He revealed that in the 1990s there were no informal gold buyers and miners used to travel to Harare to sell their gold to FPR. During the same period Dalny Mine provided miners with some assistance mainly in the form of water however the mine closed and the assistance ceased. He said in the early 2000s law enforcement agents began coming to the mines and soliciting for bribes. He stated that during his time in mining the MMMD has never provided any support to the miners and that when the economy started melting down and unemployment grew many people started coming to the mines. The miner spelled out the things he would like to see happen to improve the ASM sector i.e.: new miners should be capacitated; Government should change its policies and regulations; EMA should take a different stance and not just collect money and bribes; LSM in surrounding areas should help with knowledge and equipment; service centres should be set up; and

[61] *Pure gold*

[62] *The price of gold was set or 'fixed' for the entire week*

[63] *Sponsorship is when an individual/organization purchases all inputs for ASM miners and then gets a share in the output (usually 25 - 30%). The expenses incurred by the sponsor are however expensed of the output before the sharing of the net profit.*

[64] *(Former Employee of Tetrad, 2014)*

FPR must relocate to Chakari as miners have no time to travel to Kadoma. Also, electricity should be made accessible in rural areas where most mines are found. This, he said, would enable the production of a lot of gold.

- A former official from the RBZ (in Kadoma)

The official stated that remarkable incidents in the gold mining and trading sector in Zimbabwe date back to the year 2004 when a gold buying centre for FPR was established in Kadoma. There was liberalized gold market and buyers would work on a commission of 5%. The RBZ had a lot of mines at the time and could buy all the gold available. Close to the end of 2004, the RBZ Governor put limits on the amount of money that could be spent as he felt the spending levels were fuelling inflation and devaluation of the national currency. The limit on gold buying that then prevailed from the end of 2004 to 2006 facilitated the rise of an informal gold market. Gold delivery to FPR dropped drastically and the financial intelligence team of the RBZ prompted the introduction of *Operation Chikorokoza Chapera* which was an operation meant to abolish all forms of informal gold mining and trading. Most informal miners and traders were brutally treated under this campaign but all to the detriment of the national economy. The informal market was contributing greater than 50% of total national gold output. In 2004, contribution was 17 tonnes of gold but the successive years saw a continuous and dramatic decline until, in 2013, only 939kg were delivered to FPR. In his opinion, if the sector is ever going to revive, the Government must bring back the Gold Development Fund (GDF).

In the past a lot of gold was close to the surface and thus easy to extract but now miners have to go deeper thus increasing the risk of mine flooding which in actual fact has become very common. As a result miners are in dire need of pumps and compressors. Furthermore, mill commissioning costs are too high for instance, ZESA charges USD3000 labour costs, USD11000 for a transformer, and USD4800/km wire. Most of all, taxes need to be reduced for ASM to realise more gold flow through RBZ. The rates that large scale mines pay, for example in royalties, are exactly the same rates being paid by the financially disadvantaged artisanal and small scale miners. Furthermore, there are too many government controlling bodies playing in the ASM field all of which are drawing from the little money that the miners possess. Taxes are being charged by RDC, EMA, ZIMRA, MMMD, FPR, ZINWA and NSSA. ZIMRA taxes 9.5% on every transaction and RDC taxes USD100 per single stamp on a mill to mention a few. After collecting exorbitant taxes from miners, FPR enjoys a 15% rebate when gold is sold to the Rand Refinery in South Africa. This means Fidelity robs miners of about 25% of their revenues. As a result we have a serious parallel market. Measures that were taken by the government to ensure all gold comes through FPR have been futile. The police officers placed at every mill can be easily bribed to allow gold out. Politically influential people are also perpetrating the illegal trading and smuggling of gold out of the country.

- The Story of a Driller (from Shurugwi)

The driller revealed that he got his experience and skills from working in an LSM. He now provides his services to artisanal miners who, however, often cannot afford his asking price. He revealed that as the economy is stalling and gold prices have fallen, business opportunities for him and his fellow drillers have reduced, not just within ASM but also in LSM as most exploration work has been shelved.

2.2.5. A reflection on key successes, failures and lessons learned in the evolution of ASM in Zimbabwe

While Government's approach to ASM has gone through very different stages over the past three decades, there are some key lessons to highlight. Firstly, ignoring the sector as the Government did in the 1980s makes it conducive for the proliferation of informal activity. And, in a sense, lets market forces determine the price of gold which benefits the miners as more gold buyers enter the sector and competition increases. However it creates a large unregulated economic sector, and leads to illegal exploitation of the nation's natural resources – a scenario that the government realised in the early 1990s.

Secondly, the legalization of ASM should take a holistic view of mining, processing and trading. The Mining (Alluvial Gold) (Public Streams) Regulations (SI 275/1991) focused on environmental protection and gold trading, and did not take production into much consideration. It is also very important to ensure that laws are well implemented to capacitate the government agents who are custodians of the law. RDCs were ill equipped to enforce the SI 275/1991.

Government's attention on gold has been driven by its reliance on it for foreign currency reserves generation which historically made the Exchange Control Office of the RBZ the most influential government agency in the gold mining sector. While the use of multiple currencies has made the mandate of this office redundant it still wields a lot of power in law which if a local currency is introduced, restores the office's influence and power which includes determining the local price of gold. In the 2015 National Budget Statement the Minister of Finance and Economic Development reiterated government's stance that a multi-currency system will be maintained until 2018.

Government has liberalized the gold buying sector twice. Firstly in 2002, it licenced private gold buying but tightly controlled exports. Lessons learnt during this period include the fact that an aggressive approach to gold buying is effective in ensuring miners sell their gold to the formal market. FPR received its highest ever delivery of gold from the ASM sector in 2004 when it received 17 tonnes of gold. Another key lesson was in relation to tribal stereotypes in rural areas and political offices, for example the GMMDT appointed gold buyers with Shona sounding names in Bulawayo Mining District, a predominantly Ndebele region, and they were resisted by the political leadership.

Operation Chikorokoza Chapera underlined the inadequacy of using command and control mechanisms as a sole response to the proliferation of illegal ASM activities. While effective to some extent, they should be used in a manner that respects human rights and in an already enabling environment which entails adequate laws and policies, well capacitated government agencies that regulate the sector and government support for formal actor. The introduction of EIAs has been a progressive move for environmental protection but has been found to be a barrier to livelihood formalisation as the costs of conducting an EIA and having it regularly reviewed are beyond the reach of most miners.

It is imperative that we take cognisance of lessons learnt from prior developmental projects in ASM. GTZ learnt that legislation should be thoroughly assessed for unintended consequences and that it should not incentivize illegal mining by making compliance too expensive or difficult. The Austrian Foundation for Small Mines attempted to provide soft loans and grants but this failed due to the low chance of having loans repaid while the costs of administering the program might be higher than the

amount of grants and loans given[65]. The requirements for obtaining a loan should also be simple enough for the ordinary miner to have access to the loan/grant facility.

The Shamva Milling Centre provides some key learning points. It was emulated in so many countries because it succeeded in identifying and addressing a real need of small-scale miners i.e. custom milling services. Secondly it involved key stakeholders such as the RBZ from the beginning. However today it lies idle because it became a victim of its own success, i.e. the high demand for milling services led to a review in operating procedures where more well established miners got preference thereby preventing the intended beneficiaries from accessing the services. Other than the presence of RBZ to collect gold the SMC received no other government support. A key factor in failure was the hasty transfer of management by the foreign donors to a local association of miners. However above all, the single biggest problem encountered at SMC were the poor business decisions made by the mining association's executive committee concerning the operations of the centre. Producers may well be better off to leave the management of commercial projects to experienced and qualified managers while they enjoy an efficient and competitively priced service.

Great care has to be taken in working with associations to ensure that a few powerful people in the association do not monopolise benefits for individual gain. It is important to be sensitive to the complexities of miners' organisational structures in programming. One positive lesson is that it has been proven that technology unlocks the potential of small-scale miners to run viable mines though this does not necessarily mean that the minerals will be sold to the formal market. Small-scale miners, like any other entrepreneurs, require a complete package of business development services to thrive and grow. In addition to technology, they require skills in business planning and management, mining methods, sustainable environmental management and access to credit and profitable markets.

[65] *There is a zero rate of repayment on equipment loans from government*

2.3. Review of international practice in regulating ASM gold & facilitating ASM-Industrial mining coexistence relationships

2.3.1. Introduction

Zimbabwe is at a crossroads on how it manages its gold sector. Two challenges lay in front: first, how to encourage artisanal gold miners and informal traders to mine and sell legally and, second, how to produce more jobs for local Zimbabweans through meaningful productive relationships between all scales of miners from artisanal to industrial. This report scopes different models for both goals that have used with success internationally that may serve as inspiration as Zimbabwe debates its future path. This section of the report covers two areas:

- Gold sector regulation, the diversity of practices, and real-world examples to relay key lessons learned globally in improving the quantity of artisanal gold entering formal trading chains; and
- Industrial mining coexistence relationships including opportunities and operational challenges and examples of diversity of practice in coexistence and production approaches.

2.3.2. Methodology

The research for this section of the report has been desk based and relies primarily on publically-available literature, non-public documents that have been shared with Pact, interviews with subject matter experts, and a snowball-approach to reaching other informants. Due to the sensitivity of some of the content, reports were often shared with Pact under the condition that they are not made public. Confidential reports are marked clearly in referencing as such.

Two guiding questions were the basis of this section of the report:

• *What are 'good practice' examples in countries that have successfully increased the amount of gold going into legal chains of custody?* Note: The examples provided here focus primarily on approaches in increasing gold into legal supply chains and not necessarily approaches that incentivize 'greener', more responsible mining on which other studies may focus.

• *What are other examples of successful coexistence between ASM and industrial miners?* Guiding questions will include: what motivated these coexistence relationships, what is the enabling policy environment, and what are key lessons learned?

2.3.3. Review of international practice regulating ASM

Introduction & key challenges

More than 70 countries around the world host artisanal and small-scale gold mining. Most have struggled on how to regulate the sector and, in particular, how to tax it and encourage it to trade legally into formal channels. This challenge is compounded by a number of issues, such as:

- Insufficient enforcement power by the state to both enforce laws and stop smuggling;
- The fact that gold is easy to smuggle because, like precious stones, it is a high value, high-density commodity and it is therefore easy to hide;
- Gold ASM often occurs in rural regions without a large state presence and there are tradeoffs regarding the level of staffing required to monitor; and

- Lack of long-term interest and commitment. Most government-initiated gold ASM governance programs follow cycles of engagement and disengagement[66] once the program's initial champion has moved on or when the reality of ongoing costs to properly regulate the sector become apparent.

As a result, there are only eleven known examples of state-run buying programs from the last three decades; these include Bolivia, Burkina Faso, Colombia, Cote d'Ivoire, Ethiopia, Ghana, Kyrgyzstan, Philippines, Tanzania, Venezuela, and Zimbabwe.[67] Of these, only six continue (including Zimbabwe's) and five have folded due to an unsustainable financial approach, corruption in implementation, or other reasons.[68]

Differing buying regime structures

In most developing countries, the respective laws typically seek to insist that artisanal and small-scale gold miners sell through government-run marketing agencies or buying programs involving government banks.[69] Buying systems are typically structured in one or more of the following ways:

- State-run buying centers (in gold: State-run Gold Buying Programs (SGBPs)) are set up and miners are instructed to sell their gold at a fixed price according to purity of the material and, usually, based in some part on the London Bullion Market Association (LBMA) daily rate. The SGBP is to serve as a state-run monopoly;[70]
- In some countries, approved intermediaries are contracted by the State to operate in regional mining districts to extend and improve the reach of the State-monopoly; and
- In a few contexts, non-State run systems are allowed. Buying systems can exist for certification programs like Fairtrade using well-documented traceability protocols and official buyers and exporters. To encourage participation in the system, financial 'premiums' are awarded to miners' organizations (e.g. cooperatives, etc.) and associated traders who abide by the Certification systems' rules for transparency, environmental & social performance guidelines, and monitoring requirements.

To date, most buying regimes have been motivated primarily by economic reasons (rather than social) and with the express goals of either boosting the government's central gold reserves or the amount of hard currency held by the state. [71] A SGBP can also provide a central opportunity to tax ASM produced gold, though it is likely already taxed at various points before reaching the SGBP. Lastly, in theory, state-centered buying systems could be used as a tool to incentivize legality through the use

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66 Anon 2012. Confidential global review of state-run mineral buying systems.

67 Anon 2012.

[68] *The five that have closed are: Burkina Faso, Colombia, Cote d'Ivoire, Kyrgyzstan, & Tanzania. There are two countries with programs starting up. These include Mongolia and Cameroon. Source: Anon 2012.*

[69] *Kambani, S. 2006.p44-45.*

[70] *Kambani, S. 2006.p44-45.*

[71] *There are two countries with programs starting up. These include Mongolia and Cameroon. The six currently-operational buying programs include: Bolivia, Ethiopia, Ghana, Philippines, Venezuela, & Zimbabwe. The five that have closed are: Burkina Faso, Colombia, Cote d'Ivoire, Kyrgyzstan, & Tanzania. Source: Anon 2012.*

of the system as a leverage point to reinforce good ASM governance and the State's regulatory powers up the supply chain.[72] In exchange for buying gold, the state can demand legal documentation for the mine from which the gold came. However, lack of true and prolonged monitoring and enforcement capacity and the typical scenario of widespread illegal mining often make this potential tool an unrealized one. Moreover, lack of financial competitiveness of the SGBP and lack of understanding of existing mining and trading dynamics also sinks most efforts. In short, simply setting these systems up does not mean that all legal miners will sell to them. In addition, requiring legality as a condition to selling to the SGBP means that illegal miners either must resort to fraudulent documentation and in-bound smuggling into legal chains or, having no official place to go, turn to the (usually) many grey market participants willing to buy from them. State-imposed buying monopolies were attempted in Bolivia, Colombia, Cote d'Ivoire, Ghana and the Philippines and failed in almost all (except the Philippines), primarily due to inability to compete over time with grey market traders.[73]

For SGBPs to work in practice, the buying regime must confront the ASM 'holy trinity': price, convenience, and social-relationships (including debt). This is explained in the following sections.[74]

Competitive factors

- **Price**

On price, Ethiopia has found success in offering above-market prices for gold in attracting gold (of all origins) to its coffers. Kenya and Tanzania have previously tried similar systems. Kambani writes:

> *"Kenya solved its gold smuggling problem by paying a market price plus a 20% premium as an export incentive... In Tanzania, with the introduction of measures to pay competitive prices to those on the black market, there was a dramatic increase in the amount of gold declared through the Central Bank."*[75]

However, this has been tried in other countries with mixed results. In Colombia, the model collapsed when the State was forced to sell a significant portion of its gold reserves to defend the value of its currency on international markets because of its external debt burden. [76] In other cases such as Ghana and the Philippines, despite the state-operated buying program, over time informal gold traders made in-roads by offering close to international prices. Further, in recent years in Colombia[77] and Ecuador,[78] grey markets are able to offer above-market prices due to gold being used by mafias and drug cartels for money laundering. The chart below shows the effects of price fixing in SGBP.

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[72] *Anon 2012.*

[73] *Anon 2012.*

74 In his review of historical data, Kambani, S. 2006 says that liberalization of systems has occurred in some countries such as Zambia but that smuggling persists nonetheless therefore indicating that other factors other than price alone are also important. Kambani, S. 2006, p. 48.

75 Kambani 2006 (p. 50), relying in part on research by Walrond, 1989.

76 Massé, 2012 in Anon 2012.

77 Anon 2012.

78 Villegas, C., Griedl, P., and Jorns, A. (2013). "Gold mining & conservation: A situational analysis and response plan in Ecuador." The report was written for the ASM-PACE Program, a joint initiative of the global conservation organization WWF and Estelle Levin Ltd.

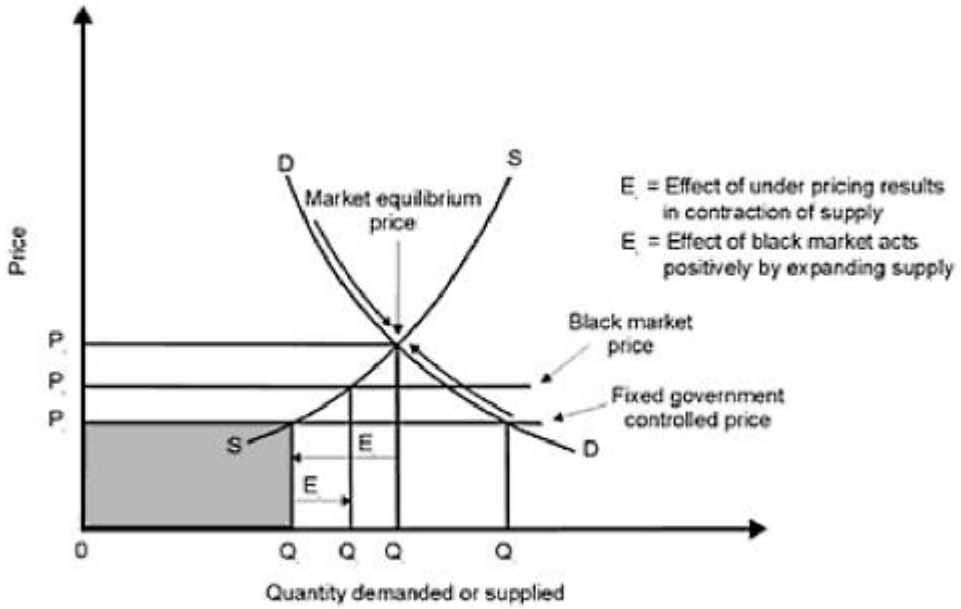

Figure above: The effect of under-pricing in SGBPs[79]

Related to price is the currency in which gold is traded and also the speed in which miners are paid. The common practice of SGBPs are to pay in local currency. In contexts where local currency is overvalued, informal traders offering foreign currency (e.g., US Dollars or similar) can increase their appeal.[80] In all cases, informal traders become more attractive to the state because of the close price comparison and especially that they are often willing to pay in cash, immediately, and with no requirement for paperwork.[81]

In focus: Ethiopia

Gold mining is Ethiopia's second-largest earner of foreign exchange after agriculture. Launched in 2008, the SGBP is operated by the National Bank of Ethiopia (NBE) and pays 105% of the LBMA global gold spot price. This high price is then forced upon the domestic jewelry industry, which are no longer allowed to buy directly from ASGM and instead required to buy only from the NBE and its authorized agents. For goldsmiths, there is now a minimum purchase requirement of 250g from the government and bars come with the seal of the NBA imprinted on them. The policy tradeoff appears to be sacrificing the international competitiveness of the Ethiopian jewelry

79 From Kambani, S. 2006.p46.

80 Kambani, S. 2006.p46.

81 Discussed in Kambani (2006) and observed by Villegas: In Ecuador, Villegas interviewed informal gold miners and they said that two reasons formed the basis of their not selling to the official state system: there was no buying office in the area they were mining and – more so—when they did sell to the government in the past, it took them weeks to get paid. They said they prefer to be paid immediately and do not want to wait. Villegas, C., Griedl, P., and Jorns, A. (2013).

industry for the benefit of more gold into NBE coffers. The motivation of the program appears to be increasing the country's stock of hard currency.

The Ethiopian SGBP has allowed authorized partners to also buy gold in the interest of improving participation. The main partner includes the Commercial Bank of Ethiopia, which has regional branches and buying capacity in Assossa, Hawassa, Jimma, and Mekelle. [82]

Banks are sensitive to the needs of miners for immediate payment and therefore typically pay 90% of the monies owed within 24 hours. The remainder is paid within a month. A service charge of 2% of the transaction is levied; this is thought to cover air-transport charges to collect the gold from mining regions. [83]

The buying system appears to be attractive for miners as evidenced by reports of regular in-bound smuggling from neighboring countries to take advantage of the higher gold prices in Ethiopia.

In private gold-buying systems (those not run by the State), these can operate in a few different ways. They can operate illegally and clandestine or relatively openly.[84] Alternatively, there are systems such as FairMined, Fairtrade, Better Gold Initiative, and others, that service 'ethical and fair trade' (EFT) markets. To incentivize participation in the initiatives, they offer a higher gold price to participating ASM organizations (often cooperatives) that have met their high production methods and trading standards.[85] EFT standards typically cover issues such as extraction methods (such as mercury use in processing), occupational health & safety standards, environmental management, transparency & democratic governance within the ASM Organization (ASMO), etc.[86] Each EFT organization's standards typically go beyond a given country's national mining law and typically offer a suite of supports to ASMOs in the form of technical coaching, pre-certification audit and post-audit assistance, export-route support, facilitation of financing (i.e. finding additional sources of finance but not necessarily providing pre-financing), etc. In exchange for meeting these high expectations, successful EFTs offer a good price and a stable buying relationship for ASMOs. For example, Fairtrade exacts some of the highest ASM standards in the world but also offers a minimum guaranteed price of 95% of the LBMA trading price. To encourage even greater levels of 'responsible mining', it offers an 'Ecological Fairtrade Premium' which is paid on top of the Fairtrade minimum price.[87] Several studies have shown that a large share of western consumers are willing to pay slightly more for products that come with the guarantees that Fairtrade's logo signifies.[88] The downside is that these EFT systems require a lot of upfront time and resource investment that ultimately slows the pace that they can be scaled-up. That stated, nearly all EFT systems are looking for additional ASGM production sites for their product pipeline.

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82 Yelibenwork, 2011.

83 Mesefin, 2012

84 For example, its common knowledge in northern Ecuador that jewellery shops and lottery stores are also buying illegally mined gold in the area. See Villegas, C., Griedl, P., and Jorns, A. (2013).

85 See Villegas 2014.

86 Villegas 2014.

87 Villegas 2014.

88 For example, see Howard and Allen (2008), Loureiro and Lotade (2005) cited in Hilson 2014.

- Convenience

Next to price, convenience is another key aspect of why a miner would or would not sell into a given formal system. The challenge to most state-run buying systems is becoming convenient for miners and supplanting the role of local gold traders, who are able to travel to remote mine sites and offer a quick transaction with little hassle.[89]

Some buying programs have opted to use approved intermediaries to serve this role and these programs have faced two categories of challenges have arisen: choosing an effective intermediary and then keeping their loyalty.

If a buying program is too centralized and does not have enough well-located offices in mining regions, it risks a situation where the only people who will come to sell to them are local and regional traders and not the miners themselves. This has been the case in Bolivia, Colombia, Ghana, and the Philippines.[90] A similar result may occur when gold purity and quantity standards are too high; those that can capitalize on economies of scale will be the ones selling gold into the official system.[91] Other gold might seep out of the country in other ways, or be sold to traders who send it elsewhere or into the formal system if prices are sufficiently attractive and tax burdens are not discouraging.[92]

Philippines

The Philippines' SGBP began in the early 1980s and by 1991, the government began requiring all ASGM to sell to the country's national buying program. The system was created to offer better prices to miners in an anti-poverty effort and deter them from selling to the grey market.

Buying stations share office space with regional government offices, which save costs. When miners or intermediaries want to sell gold to the government, the seller is responsible for bringing the gold to the buying office. Once it arrives, their product is preliminarily assayed on the spot. World market prices are calculated, minus a small processing charge, and 99% of the fee is paid on the same-day of the sale. Gold sellers are limited to a cap of 10kgs of gold per day. Final assaying is done and the remaining money is paid within two weeks.

To sell, a person must register with the system and provide a copy of their ID, residence card, and bank account information. For each batch of gold delivered, the seller is to provide a letter stating if the gold is from recycled sources or from ASM.

There are some challenges. The seller is made responsible for ensuring that there is no mercury amalgam of any quantity, that it is free of slags (other contaminants such as metal oxides). While

89 Kambani, S. 2006 and Anon 2012.

90 Anon 2012.

91 Anon 2012. They cite the example of Ghana's PMMC that only buys large quantities of gold. Miners are then forced to sell to middleman instead of directly to the SGBP.

92 Kambani 2006 discusses the well-known issue of tax evasion and its contribution to whether a miner or trader will use the formal system or not. Anon 2012 describes rampant tax evasion in Mongolia and the Philippines to avoid 7-10% taxes and royalty payments by the respective central banks. In sum: if taxes are too high, grey markets may be used instead to avoid paying taxes.

this has the benefit of giving the SGBP refined gold, it also means that ordinary miners will not have access to the system because of the technical standard required by the SGBP.

In addition, buying stations are limited. A 2012 study states that there are only five buying stations in all of gold-rich Philippines due mainly to security challenges of operating buying stations in mining areas, in addition to cost constraints. Keeping a minimum number of buying centers keeps program operational costs low, in addition to its risk. However, the program's structure strongly reinforces the role of traders, who now serve a dual purpose of refining and secure mineral transport to the buying stations. World prices continue to make the system attractive relative to grey market forces and it was widely regarded as a relative success until 2008, when a new tax regime was introduced. The small tax change (specifically an excise tax of 2% at the point of sale and a 10% creditable withholding tax) changed the calculus of gold sellers and the appeal of the grey market. [93] Once enacted, gold purchases declined more than 75% in a single year (from 7,166kg per year to 1,722 kg annually)[94] and in a time when gold prices were continuing to rise. Gold is presumed to have been easily redirected to China, Korea, Indonesia, and Malaysia.

- **Social relationships**

The last common component into whether gold is sold into legal trading chains is the conditions of its finance. Artisanal gold is often owned before it comes out of the ground because pre-financing and other debt relationships that miners have with local traders or financiers.[95] Due to its high risk, securing funding is a constant challenge for most ASM producers and buyers often engage in pre-financing miners where money is loaned against future production or in exchange for below-market prices. In the first case, where loans are made as an investment in a site's production, 'security' can be placed on site to prevent theft if such an agreement is struck. In some areas of the world such as Cote d'Ivoire, there can be well-established norms amongst local traders that only those who have pre-financed a site may buy from it.[96] In places like Colombia, mafias have been known to resort to coercion to prevent ASGM from accessing SGBPs. [97]

Tradeoffs

Taking the above realities into account, some SGBPs have opted to make a number of tradeoffs. This has included reducing the requirements placed on gold sellers (whether miners or traders) to the SGBPs. This has turned into a 'no questions asked' policy in Ghana and the Philippines, though this has had the effect of undermining attempts to formalize ASGM since a point of leverage for promoting legal mining (i.e., the SGBP) was sacrificed in the interest of increasing legal gold into the state-run system. States adopting this approach have faced criticism:

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93 Anon 2012

94 Anon 2012

95 Kambani, S. p44.

96 See Gilbert, S., Traore, M., and Hilson, G. 2015 (forthcoming).

97 Anon 2012.

- Ghana is criticized for disjointed sector governance in prioritizing gold sales over issues of pervasive mercury use and environmental damage for which illegal ASM is blamed.[98]
- Ethiopia is accused of tolerating in-bound cross-border smuggling from other countries for traders to access Ethiopia's higher gold prices.[99]
- Critics say the Philippines' mining and fiscal policies have contradictory goals and the latter undermines the former. [100]

Additionally, a 'no questions asked' policy goes against the international trend of due diligence and traceability with regard to gold because of its labelling as a 'conflict mineral' by the US Dodd Frank Act section 1502. If a SGBP adopts such a policy, it could become excluded from some international trading opportunities if current trends become global expectations. [101]

Ways forward

Based on the experiences of other countries, there are a number of ways other buying programs can be the preferred destination of gold:

- Pay quickly: Same day payment makes the system competitive with grey market traders;
- Pay in cash and do not rely on bank account transfers. Not all miners are well-served by the formal banking system;
- Reconsider minimum quantities or ways the SGBPs can be flexible on minimum quantities with known clients;
- Where feasible, extend banking services such as flexible financing and micro-loans to known customers. Grey market financiers gain great power by offering pre-finance to ASGM operators;
- Strive for convenience in location and in transactions. The mobility of grey market buyers is a buying advantage. If buying centers are not in mining districts, traders will dominate selling;
- It is extremely difficult to use SGBPs as a formalization tool to enforce mining standards. The programs should synergize but SGBPs are most effective at attracting gold when there are few demands of sellers; and
- Harmonize tax and royalty systems with neighboring countries to reduce the ease and likelihood of tax evasion.

2.3.4. Review of good practice in ASM-Industrial mining coexistence & production relationships

Despite ASM and industrial miners all being part of the spectrum that is the mining sector, there is typically there is much reluctance by the industrial mining sector when it comes to engaging artisanal miners in the first place, much less sharing land or facilities with them. This is because operational challenges are many and the advantages are usually only considered through a community relations lens versus a commercial one. This section of the report first outlines and discusses the real practical challenges but then highlights several examples of coexistence and productive relationships that are considered to be good practice internationally.

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98 Anon 2012.

99 Unpublished 2013 review shared with the author of Ethiopia's gold policies.

100 Anon 2012.

101 Anon 2012.

Practical challenges

There are a number of basic practical challenges that thwart co-existence attempts from being pursued. These include:

- Legal risks: This can range from concerns about legal liability if there is an incident or accident. Or it can be even more basic legal issue, such as the law itself forbidding coexistence, even if the company desires it (e.g., DRC);
- Reputational risks: Artisanal mining can bring a host of challenges, from environmental management to child labor concerns. Whether a company wants to expose itself to these topics can be a reputational concern issue;
- Commercial risks: This could include concerns of delays due to 'distracting' projects or equipment damage if it is mishandled;
- Operational risks: There is the possibility that opening access to artisanal mining could 'open the floodgates' to other local requests or demands on the company; these can be seen as daunting;
- Competitive risks: There could be concerns that ASM and industrial miners could be competing for the same resource; and
- Shareholder acceptance: Communicating the value of coexistence relationships to shareholders.[102]

As the IFC's 'Working Together' handbook commented*: "The relationship between large-scale mining (LSM) companies and the artisanal and small-scale mining (ASM) sector is often poorly understood and has been troubled by a general mismatch of expectations, which has led to mistrust and conflict in some cases."* [103]

Aside from the above, a legal context can provide its own risks, such as changing tax frameworks and local content requirements. Changing political and legal contexts add short and long-term financial risk and uncertainty to a company's planning and operations. It can also interfere with the level of depth a company is willing to put into community-relations; if they foresee a short-term time horizon, they may choose not to invest at all or invest in short-term Corporate Social Responsibility (CSR) programs that lack quality.[104]

Lastly, fluctuating gold prices can mean not only financial ruin for gold companies (for example, if the gold price falls below the costs to produce it) but fluctuating prices can also upend earlier agreements. For example, when the gold price increases, there may be a marked influx of ASM who may expect to access part of the concession but who were not involved in original negotiations or systems-design.

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[102] Personal communication between Villegas and Professor Gavin Hilson, Nov 2014

[103] CASM, CommDev, ICMM (2010). Working Together: How large-scale mining can engage with artisanal and small-scale miner. Available online here: http://www.icmm.com/document/789 (Accessed Nov. 2014) .

104 RJC 2014.

However, an industrial mining company could also break an agreement with local ASM producers if it is sold to another company and the new management chooses to scrap working models.[105]

Key opportunities

While it is perhaps easiest and most natural to focus on the risks of cooperating with ASM, there are opportunities as well as risk management strategies. For example: [106]

Legal and compliance risks

- Risk mitigation through direct engagement.

Reputational risks

- Measurable development contributions through engagement programs.

Commercial risks

- New commercial opportunities through compliance with standards such as RJC or participation in sourcing programs. *Example: Eurocantera (Honduras).*

Operational risks:

- Strengthened social license to operate;
- More efficient mining operations through the use of the entire concession and not only the commercially-attractive areas; and
- Reduced security costs through increased engagement of local residents.

Real-world examples of coexistence

There have been a few notable examples of success in ASM-industrial mining coexistence. Responses typically fall within the following seven categories:

- **Tolerance**. For example, in Venezuela, the Las Cristinas mine of the Placer Dome Company has pursued a policy of tolerance for ASGM on their concession. They have engaged in limited formalization assistance and interventions on mercury and safety issues. [107] In Ghana, Goldfields adopted a 'live and let live' approach that tolerated ASM as long as the miners did not interfere with the company's activities.[108] Apparently it was only workable in the short term due to changes in mining decisions from company leadership (such as deciding to mine 'once-marginal resources'on a concession).[109] Though many industrial operators appear to

105 Personal communication between Villegas and Professor Gavin Hilson, a leading academic on these issues.

106 Multiple sources: CASM, CommDev, ICMM (2010); Garrett 2014

[107] Garrett, 2014

[108] Aubynn 2009 in Collins & Lawson 2014.

[109] Aubynn 2009 in Collins & Lawson 2014.

have adopted the same tolerance strategy in Ghana (from AngloGold Ashanti to Newmont Ghana). [110]

- **Technical assistance (TA)** or mentoring relationships. Mondlane describes: *"For ASM operations, mentorship facilitates technology and skills (both entrepreneurship and specialized skills) transfer, at low cost, allows small-scale miners access to working capital, promotes legal, environmental and regulatory requirements compliance, and improves the overall working of ASM due to the adoption of best practice."* [111] Real world examples of this include the Benguet Corporation's Acupan Contract Mining Project in the Philippines. The company assists gold ASM producers to identify locations to mine, assists them with startup operations, assists with mine site planning and implementation monitoring, then buys the ore they produce and sells the final product to the Philippines' Central Bank.[112] In some ways, the company has taken on a role of advisor, middleman, and financier. [113] Observers have questioned the scalability of the model as it is currently small in scale.[114] Hinton (2003) provides some warning on technical assistance programs. She recommends that technical interventions be of increased or equal simplicity, be demonstrably better, and facilitate quick recovery of materials, and be delivered in culturally sensitive and appropriate ways, or else they are unlikely to be adopted.[115]

- **Subcontracting relationships** for core and noncore functions for improved relations with SSM groups[116] (e.g., contracting for ore recovery, contracting for transport services, security, etc.)
- **Shared facilities programs**. For example, see the Eurocanteras example in section 2.3.4.

- **Joint venture relationship**: This situation is when an LSM company partners ASM groupings. For example, in Bolivia, Coeur d'Alene Mines Corporation (the world's largest publicly-traded primary silver producer) works via joint venture with organized ASM cooperatives representing 15,000 local artisanal miners. This arrangement began due to the unusual legal framework in Bolivia that declares the Bolivian national mining company as the owner of all mines in Potosi through a nationalization process in the 1950s. The government then leased the

110 Aubynn 2009 in Collins & Lawson 2014.

111 Mondlane Jr., S., n.d. Mondlane described a situation whereby an industrial mining company could 'adopt' "several SSM companies and provides them with technical and business support, including guaranteeing their borrowings from commercial financial institutions. The SSM companies [would be] expected to graduate to fully fledged businesses over a given period, normally five years, after which the LSM Company will adopt another company."

112 Velez 2005

113 Velez 2005

114 Garrett 2014

115 Hinton et al. 2003b in Collins & Lawson 2014.

116 Mondlane Jr., S., n.d.

mining rights to the alluvial gravel deposits to local area ASM cooperatives: *"The cooperatives in turn have subleased their mining rights to Coeur's subsidiary Manquiri through a series of 'joint venture' contracts… Coeur has been proceeding with its capital investment in the project at a measured pace"*[117] due to the ongoing political situation in Bolivia. Its investments in the country had been insured via the US government's Overseas Private Investment Corporation (OPIC) which is intended to insure private sector investments in politically risky countries against such events such as '*expropriation, political violence, or currency inconvertibility.*'[118]

Example of a real-world joint venture structure

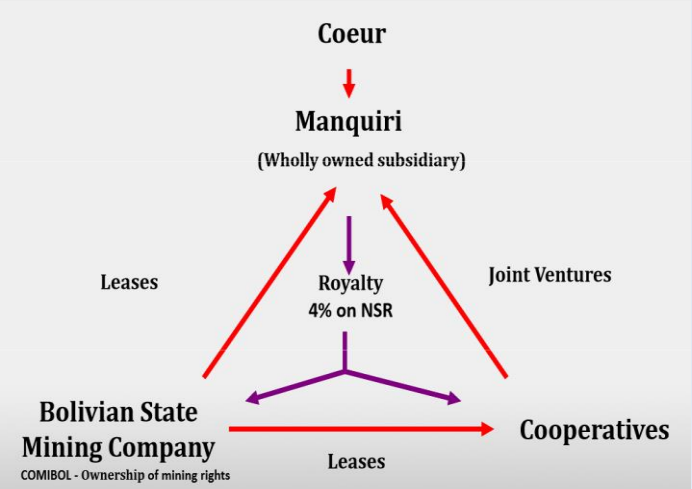


Figure 5: Structure of the Coeur mine's joint venture relationship between it and the ASM cooperative partners with the Manquiri mine in Bolivia.

- **Tributing** system.
- **Buying programs**, where an industrial producer buys from local ASM organizations that are operating on or around their concession. Pact has facilitated these arrangements on several industrial sites in Katanga province in DRC.

Table 2: Types of ASM-Engagement Programs

Types of ASM-Engagement Programs	
Corporate-led formalization and professionalization programs typically have one or more of the following components, depending on the context and level of professionalization of ASMO:[119] • Geological support • Licensing assistance • Access to finance • Professionalizing from artisanal mining to small-scale mining	Donor or NGO led programs typically have the following components: [120] • Formalization programs • Cooperative formation assistance • Technical capacity building programs • Mercury reduction programs • Micro-credit or other loan programs, or small-grant programs • Certification programs, like Fairtrade or FairMined

117 PR News Wire, 2006
118 PR News Wire, 2006
119 Garrett 2014
120 Collins, N. & Lawson, L. 2014.

• Organizational development (e.g., help setting up cooperatives or small-businesses, etc.) • Taxation • Attaining regulatory compliance	• Beneficiation programs, such as lapidary training initiatives • ASM-industrial mining coexistence programs • Environmental remediation training programs • Alternative or supplementary livelihood approaches

In focus: Eurocantera (Honduras)

Eurocantera is an industrial gold company based in Honduras in Central America and owned by Europe-based Goldlake Group. Goldlake operates three mines of which all are in Latin America (Honduras and Argentina). The Eurocantera site is in Central Honduras in Olancho district's Lepaguare Valley, located about 2.5 hours from Tegucigalpa, the country's capital city. The concession is a 10,500 acre site containing an alluvial gold deposit. The company has 27 fulltime employees, uses semi-mechanized methods, and contracts ASM labor in production agreements with ASM cooperatives from the nearby towns. Processing is done by gravimetric concentration only.[121]

ASM were active on the site before the company secured rights to the concession in 2006. Before the partnership, ASM used sluices and panning but suffered significant losses due to the rudimentary methods. The company took the following steps:

- **Adopted a policy of inclusion versus exclusion**: *"Rather than exclude the informal groups – often made up of family members – from the concession, and make an already hard way of life more difficult, Eurocantera decided to find a way to incorporate them into the mine's business model."* [122]
- **Assisted miners with formalization and self-organization**. The ASM cooperative had been operating in a grey legal space. The company arranged legal assistance for the cooperative to become fully recognized and fully legal under Honduran law. [123]
- **Focused on preserving livelihoods and the environment**. The company *"commissioned international consultants to complete an environmental impact assessment that revealed the possibility for the mine to develop the project with the goal of a net positive impact on the local ecology. The mine is a zero waste site that will leave behind a larger indigenous forest on closure than it found when it arrived."*[124] The quality of the forest cover could be a point raised by conservation critics.

The partnership between the company and the ASM cooperatives is based on the following:

- ASM cooperatives reach agreed-upon occupational health and safety (OHS), labor, human rights, and environmental standards and in exchange the company would invest in mining

121 RJC 2014
122 RJC 2014
123 RJC 2014
124 RJC 2014

efficiency of the cooperatives such as investments in mechanization, process improvements, and access to the plants' smelting facilities in-country and, eventually, to its refinery in Italy. [125] Babson 2012 describes the precise interventions:

> *"Some of the technological improvements were simple yet highly effective, introduced after observing how the miners worked physically. Eurocantera introduced the use of mats and channels, which trapped heavy particles, to replace the panning technique and also to keep workers out of the water as much as possible. Eurocantera developed a heavy particle concentration mineral separation technology (HPC-10 ExtracTec) and built a machine that allowed cost-effective gravity separation of materials with differing densities. Workers used the machine at the river. The company purchased an excavator for the workers, who had been mostly searching the surface because they could not dig deep into the river bed where alluvial gold had settled. The excavator could easily dig out the earth, and workers could filter the soil with river water. Eurocantera trained people to operate the machinery and did not charge the cooperative for this service. If bad weather stopped operations, unused machine hours were at Eurocantera expense. The only costs to the cooperative were maintenance and diesel fuel."[126]*
>
> *"The new technology and the organized workforce improved gold extraction efficiency. Each work area on the river was better utilized… Eurocantera's agreement with the cooperative enabled mining groups to manage revenue from gold sales and minimize risks. The cooperative integrated the local workforce with the mine's production system and productivity targets. In case of low production, Eurocantera absorbed expenses without charging the cooperative. The extraction process built by Goldlake for the cooperative reached a daily capacity of 100 grams. Local miners who operated inside the mine concessions supplied almost one-third of Goldlake's daily output of 450 g."[127]*

Eurocantera invested about USD35,000 for the HPC-10 ExtracTec, some USD25,000 for the collection truck, USD500 for channels and mats, and paid USD53 per hour for cooperatives' ongoing use of the excavator. [128]

- The company is a member of the Responsible Jewellery Council (RJC), which provides market access to elite jewelers provided the supplier-members meet RJC's rigorous standards for certification.
- Eurocantera's mine now provides 'responsibly produced' gold to Cartier. Cartier purchases the mine's entire production[129] and pays a 'social premium' for this high standard of

125 RJC 2014

126 Erzurumlu, S., Anderson, M. and Stewart-Carter, A. 2012.

127 Erzurumlu, S., Anderson, M. and Stewart-Carter, A. 2012.

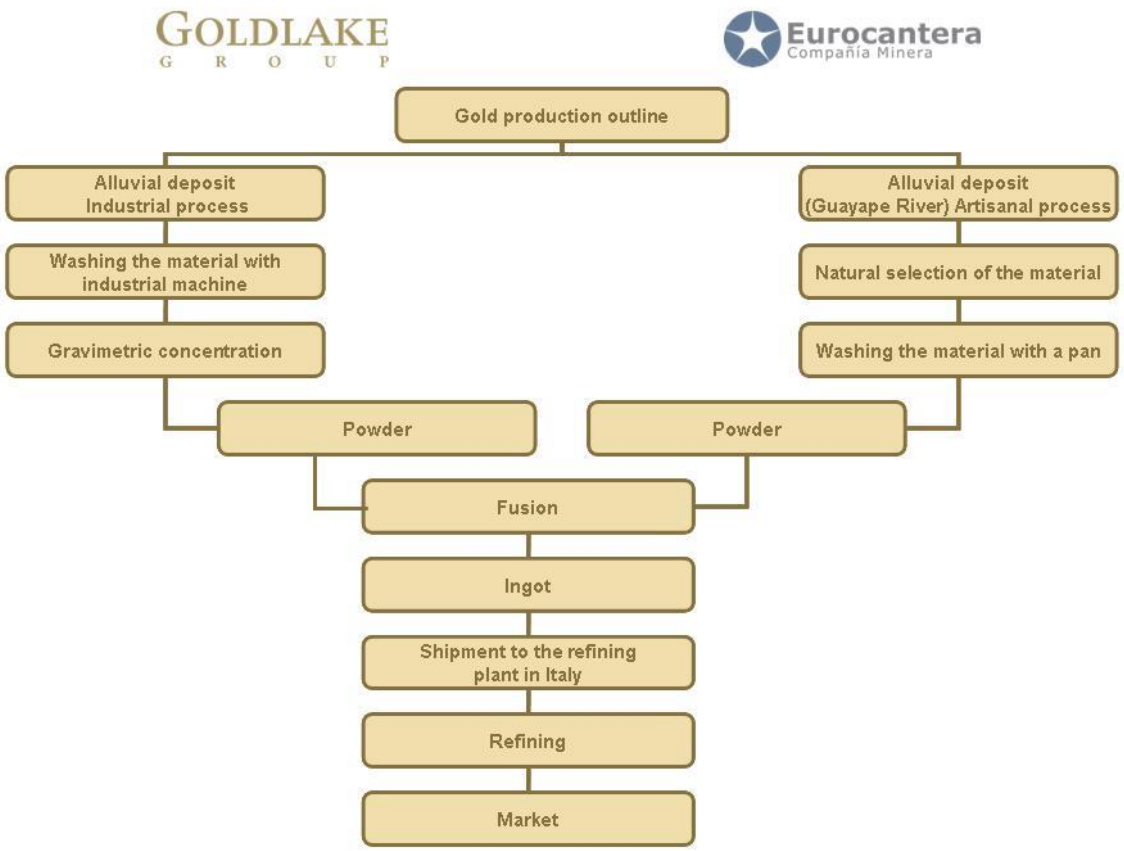
128 Erzurumlu, S., Anderson, M. and Stewart-Carter, A. 2012.

129 According to Cartier's website: http://www.cartier.com/maison/commitments/cartier-and-corporate-social-responsibility/resources-excellence/gold-12160 (Accessed November 2014)

production and the financial premium is used to benefit the ASM communities.[130] According to the company's website, two-thirds of gold production at the Eurocantera site is via its industrial methods and one-third is from its one-site ASM producer partners. [131]

- The independent auditing firm UL provides the third-party auditing required by RJC certification.

Table 3: Integrated supply chain of gold produced at Eurocantera mine in Honduras.



130 RJC 2014

131 http://www.goldlake.co.uk/The_projects/Eurocantera.aspx (Accessed November 2014)

2.3.5 'Good practice' designation

The Eurocanteras case is generally considered successful however some observers have noted that the area is not considered an 'acute ASM hotspot' [132] as some other contexts would be labelled, such as Ghana or Tanzania.

Key features:

- The program has stood the test of time.
- The program adopted a formalization component, which allowed the company to be on firm legal ground when accessing 'ethical' markets. Full legality of all operators is a common requirement (e.g., FairMined, FairTrade, RJC, etc.).
- Both groups have a stake in smooth operations. Because the company and its contractors share facilities and depend on the other, meaningful cooperation is achieved.

In focus: Gran Colombia Gold (Colombia)

Gran Colombia Gold is a medium-scale industrial gold and silver mining company based in Canada and with three mines in Marmato, Segovia, and Zancudo, Colombia. The company has 21,400 hectares of mineral titles in Colombia; these are estimated to contain reserves of *"5 million troy ounces (oz.) of gold at an average production grade of 9.3 g/t in which around 110,000 oz. (3.42 tonnes) of Au were produced in 2013"* and is the largest gold and silver producer in Colombia. [133] It plans to increase production to 200,000 oz. (6.22 tonnes) soon. [134] Gold mining is done underground. The company reports that in Segovia, ore grade is 15.3 g/t and compares it to the global average of 1g/t global average.[135]

Figure 6: Mining concessions owned by Gran Colombia Gold

The company describes its relationship to artisanal miners as *"integrating artisanal miners into our mining operations"* via business contracts with local ASM organizations (both cooperatives and companies).[136] The company requires:

- Full legal compliance with local employment and mining laws;
- Full compliance with Gran Colombia's rules and procedures; and

132 Garrett, 2014
133 Garcia, O., Veiga, M. and Cordy, P. et al, 2014
134 Garcia, O., Veiga, M. and Cordy, P. et al, 2014
135 Gran Colombia 2014e.
136 Gran Colombia 2014b

- ASM cooperatives & companies work within the company's mine plan and that they deliver all mined ore to Gran Colombia's processing facility

In exchange, the company: [137, 138]

- Pays the ASM organizations using a formula based on the quantity of recovered gold and the US dollar spot price;[139]
- Provides financial and technical training to improve working conditions. The technical trainings included training on mercury reduction; this is described in greater detail below; and
- Contributes to social security pensions for each miner employed.

The company currently works with approximately 20 ASM organizations under these arrangements on its Colombian concessions; these agreements involve nearly 4,000 artisanal workers.[140] The company reports the following outcomes for it and the ASM organizations with whom it works:[141,142]

ASM & Communities	Government	Gran Colombia
• Improved OSH and access to training • Pension benefits to more than 3,000 miners; this means increased benefits for 12,000 people (assuming each miner is directly supporting 3 people). • Improved health outcomes based on better processing methods (elimination of mercury) • Improved community health outcomes because of mercury reduction	• Increased job creation and expansion of local economy • Entrepreneurism is encouraged locally through readily-available opportunities • Increased tax & royalty revenue through the coexistence system; the 'government receives taxes and royalties on mining activities that may have previously been part of a criminal organization' • Improved environmental outcomes. One recent study[143] estimates	• Reduced security costs thanks to the expansion of local artisanal workers. • Improved community relations

137 Yahoo Finance 2014.

138 Gran Colombia 2014b

139 Until recently, this worked as follows: "Miners were paid based on sampling and chemical analyses of the ore brought to the company's processing plant. Gran Colombia pays the miners for 55e60% of the gold content in the ore indicated by their analyses… Recently [Gran Colombia Gold] changed their policy and they are paying 45% of the gold content in the ore due to the recent reduction of the international gold price." Source: Garcia, O., Veiga, M. and Cordy, P. et al, 2014

140 Garcia, O., Veiga, M. and Cordy, P. et al, 2014; Gran Colombia 2014c

141 Gran Colombia 2014b

142 Gran Colombia 2014c

143 Garcia, O., Veiga, M. and Cordy, P. et al, 2014

• Improved livelihoods through regular and predictable payments resulting in: improved ability for families to plan finances; miners being able to open bank accounts; improved access to business loans • One job on the concession has created four jobs indirectly.	mercury reduction achievements of 15 metric tonnes thanks to the coexistence operations. • The company claims a reduction in mining-related criminal activities: 'gold mining is an attractive business for criminal organizations. By organizing the mining operations under the management of a public company, [Gran Colombia] fills a void that could otherwise be occupied by a criminal organization.'	

One of the company's signature initiatives has been done through participation in a multi-stakeholder partnership with the University of British Colombia (UBC), the UN Industrial Development Organization (UNIDO), the Environmental Agency of Antioquia (CORANTIOQUIA), Secretary of Mines of Antioquia, and the School of Mines of the National University of Colombia in Antioquia. Antioquia was recently labelled as 'the most polluted place' in the world in 2010 from mercury pollution. The town of Segovia alone releasing and emitting to the environment 22.4 tonnes of mercury. Mercury consumed (and lost) by 'entables[144]'in the 5 Antioquia municipalities was estimated to be between 73 and 110 tonnes in 2010. [145] The company participated in mercury reduction program focused on technical solutions[146], but – even more important—the company supported the program's success through its willingness to buy ore from local artisanal miners in the region. Local miners began avoiding the highly-polluting 'entables' and instead sold to Gran Colombia and the new mercury-free processing facilities in the region[147] ostensibly because of the higher efficiencies or because of the

[144] *privately-run processing facilities*

[145] *Garcia, O., Veiga, M. and Cordy, P. et al, 2014*

[146] *The program included international visits to demonstration processing facilities in Ecuador (facilities were funded by the US Department of State) by the owners of "entables" (privately-run processing facilities) and selected miners from Antioquia. Practical classes were delivered by UBC on the following topics: " Grinding for gold liberation; Gravity concentration using centrifuge; Flotation of gold and copper minerals; Oxidation processes for sulphides, including bacterial leaching; Methods to remove mercury before cyanidation; Cyanidation and use of activated carbon to extract gold from the solution; Cyanide destruction with peroxide; Gold refining with nitric acid; Chemical analyses of gold and cyanide; Tailings management; Water recycling" along with socially-oriented coursework focused on "Cooperative organization; Relationship of mining operations with local communities; and Business management."* [146] *Almost 40 mercury-free processing facilities using concentration and cyanidation were installed through this partnership program. From: Garcia, O., Veiga, M. and Cordy, P. et al, 2014*

147 Garcia, O., Veiga, M. and Cordy, P. et al, 2014

terms of the contracts with Gran Colombia. Area 'entables' processing gold using amalgamation had recoveries of less than 40% and even typically as low as 25%.

2.3.6. 'Good practice' designation

The Gran Colombia Gold case appears to be a good practice model of building good relations and practical productive relationships with local miners in the context of an ASM hotspot. In particular, its use of contracts with specific benefits appears to have assisted the government collect more revenue in taxes and royalties, allowed miners to benefit from higher incomes due to higher gold recoveries, and also reinforced the multi-stakeholder partnership's efforts to reduce mercury use by serving as an attractive local ore buyer.

2.3.7. Ways forward

For concession partnerships to work, a number of stakeholders must come together in a highly-coordinated fashion.[148] For this component, Garrett (2014) reminds us that *"groups of stakeholders have different capabilities that they can bring to partnerships, which can aid more effective implementation."*[149]

Table 4: Assigns a number of tasks to complete at the beginning of any partnership:

	Legal framework & governance	Health & safety, Environment	Social Issues	Formalization & professionalization
Government	Update regulations to ensure preferred options are both legal and administratively straightforward Government can update laws to support ASM certification initiatives.		Consider adoption of the Voluntary Principles for Security & Human Rights	In context analysis, consider and prioritize issues related to formalization, such as: - Permitting - Regulatory compliance (OHS, environment, etc.) - Taxation and legal trade
Companies	Create enforcement agreements with local & national	Decide site-level minimum safety standards for any ASM on site, objective	Consider gravity and scale of issues relating to systemic drivers of poverty in	At the national level, companies can:

148 The World Bank is experimenting in a convening role in Tanzania to coordinate such a partnership and it will be an important initiative to watch for practical guidance and lessons learned.

149Garrett, 2014

	authorities, including coordination meetings and escalation scenarios Develop productive relationships with ASM to create the conditions for peaceful coexistence and potentially standards-attainment Seek and support government actions to support positive coexistence relationships	measures for compliance, and clear repercussions for violations For gold, mercury reduction support will be needed. This can be delivered by independent consultant experts or in partnership with a qualified institution, such as a university or environmental NGO. Create achievable environmental minimums and procedures, considering prevailing education levels of miners.	the area, child mining issues, and direct & indirect impacts of mining on gender. Consider inviting NGO and donor partners with expertise in this area to collaborate with local officials. Create agreements with ASMO partners and traditional leaders (if applicable) regarding influx scenarios and levels of responsibility	• 'seek and support appropriate laws, policies and government action on ASM'[150] • Coalition or individual actors can develop a national partnership on ASM-LSM Companies can lend technical support to help miners reach them.

Ultimately, the keys to success include achieving the above but also:[151]

- Creating a clear vision of what you want to achieve and what key indicators of success would be;
- Understanding ASM producers' key pain points regarding costs, incentives, constraints (e.g., debt relationships, etc.);
- Including a mix of short and long-term steps;
- Not forgetting financial sustainability; plan for it in the project design. Consider this: practically, how will this continue over time?
- Engaging in an ongoing manner with ASMOs which prove themselves to be democratic;
- Finding a trusted facilitator or project manager that is trusted by ASMO partners;
- Ensuring company staff have adequate 'buy in' and are rewarded for making sure the project is a success; and
- Advocating for a conducive regulatory environment and influencing policy when it threatens progress.

150 Garrett 2014.

151 Multiple sources including Garrett 2014,

Chapter 3: Legal & Policy Review

3.1. Legal framework

The current mining law of Zimbabwe is based on the Canadian system and was first introduced at the turn of the 20th century. This 'free mining' system is an old mineral, colonial regime based on the 'first-come first assessed' (FIFA) principle intended to attract European settlers. The 'free access' traits of this system can be identified within many sections of the Mines and Minerals Act (MMA) and this, in turn, greatly reduces the ability of the Government authorities to exercise their administrative and discretionary powers.

In 1896, the British South Africa Company (BSAC) led by Cecil John Rhodes was given a mandate to administer the country and, as such, owned all the mineral rights with a few exceptions[152]. Any person wanting to mine had to purchase these rights from BSAC.

In 1923, the mineral rights were sold to the Government and all the rules applying were then taken over by Government. As a result, today, the mineral resources of Zimbabwe are held by Government as the trustee and/or custodian. However, on this issue of state ownership and exploitation of strategic resources, there is a clear conflict between the State's role as a regulator and creator of an enabling environment, and the role of the State as an operator[153].

The Mining Code refers to the whole of the comprehensive set of rules, regulations and procedures issued by the Government of Zimbabwe to regulate prospecting, exploration and exploitation of minerals within the limits of national jurisdiction. In Zimbabwe, the MMA is the principal piece of legislation governing the minerals industry and forms part of the Mining Code. It therefore overrides all other Acts affecting mining thereby making it the most powerful Act vis-a-vis natural resources management.

3.1.2. Mines and Minerals Act, Chapter 21:05 of 1961

This Act vests the ownership all the minerals in the President. It is a wide-ranging Act containing regulations for prospecting for claims, working them, health and safety, and abandonment of the claims. The Act has undergone several amendments which have largely served to attract Foreign Direct Investment (FDI) by enabling participation in LSM. The Act has even been utilized as a template for several countries' mining legislation. Examples include South Africa and Angola who are presently reviewing their mining regulatory and policy systems.

The implementation of the Act has also, to a large extent, disadvantaged SSM and ASM operations due to high licencing fees which hinder their ability to obtain Exclusive Prospecting Orders (EPOs) or to register claims in particular rich gold deposit areas in the country because there are already 'owned' by LSM who have a huge capital base to hold on to large tracts of land for periods exceeding 10 years. Consequently ASM/SSM have to wait for the claims to be forfeited for them to access them. In most cases they end up registering claims in the periphery with low values of the gold mineral deposits.

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[152] *(NPC Mutsinya: 2013)*

[153] *(Moyo S. , 2013)*

A key challenge in implementation of the MMA has been the cadastral system. The MMMD has an outdated registry of claims which has led to numerous disputes over ownership of claims as new claims may be made on top of existing claims. The lack of a computerized cadastre also makes management of returns or payment of claim maintenance fees impossible. The Treasury is thus short-changed in terms of revenues due from the sector.[154] Due to these conflicts over boundaries and lack of adequate maps, artisanal miners often deliberately encroach on and start mining illegally on legally registered claims.

Sections which currently directly affect ASM activities include those on:

- **Prospecting - Any person of 18 years of age or older who is a permanent resident of Zimbabwe or his agent may acquire one or more prospecting licences.**
- **Mining Claims - A holder of a prospecting licence may peg claims and register the claims for the purpose of mining. The size of the each precious metal[155] claim is 500m X 200m. A block of precious metal claims can constitute a maximum of 10 claims. A block can then be registered as a single mining location.**
- **Mining Lease - The holder of a mining location or contiguous registered mining locations may make written application to the mining commissioner[156] for the issue to him of a mining lease in respect of a defined area within which such locations are situated. The holder of a mining lease has the exclusive right of mining any deposit or mineral that occurs within the vertical limits of his lease.**
- **Disputes over claims – clauses in Sections 20, 23, and 24 state that the first person to peg a claim has greater rights than those of any subsequent pegger.**
- **Maintenance of mining rights – the claim owner must pay an annual fee to the Ministry to maintain the rights.**
- **Transfer of mining rights – the law allows the sale of mining rights and requires that the Ministry be informed of such a sale within 60 days of the transaction.**
- **Tribute agreements – the law allows the owner of a claim to lease it to another party as a tribute. The tributor must then apply to the Ministry for the registration of a notarial deed embodying the terms of such agreement.**

The Act does not segregate different scales of mining thus an artisanal miner and a large scale miner are equal before the Act. This has made the Act largely unsuitable in regulating ASM. After realizing this, the MMMD attempted to regulate the ASM through a statutory instrument, the Mining (Alluvial Gold) (Public Streams) Regulations.

[154] *(Local GIS Expert, 2014)*

[155] *Gold is regarded as a precious metal*

[156] *This office has been removed from the Ministry in the recent restructuring*

Mining (Alluvial Gold) (Public Streams) Regulations, (Statutory Instrument of 1991)

By the early 1990s, there was an estimated ASM population of 100,000[157], the majority of whom were panning in rivers. A study conducted in 1993 estimated that a length of 60 km of the Dande River alone was under gold panning[158]. A later study estimated the gold panner density along Dande River to exceed 100 people per km.[159]

The then Minister of Mines and Mining Development, Chris Anderson, is quoted as saying "*it is high time the [gold] panners are recognized as part of the informal sector and instead of hunting them down they should be encouraged to sell their gold to the RBZ who should pay them a higher price than the market rate to prevent them from selling to the black market.*"

The MMMD backed this statement up by promulgating the Mining (Alluvial Gold) (Public Streams) Regulations in 1991, a bold step by the Zimbabwean Government to recognise and regulate a sector that had become too significant to ignore in terms of size, socio-economic and environmental effects, and general regional importance. The Regulations were intended to stem the trend toward illegal gold panning and to capture potential losses of gold through the parallel market. There was also an explicit goal to protect rivers from siltation as well as other environmental ills.

At the time it was envisioned that the regulations would formalize gold panning activities by removing an important structural constraint to the growth of the sector by according it legal status and incorporating the sector into national development policies, and, in the process, create conditions for sustainable resource utilisation at the local level.

The Statutory Instrument (SI 275/1991) enlisted the RDCs, Mining Commissioner, Inspector of Mines, Police, RBZ and Department of National Parks and Wildlife as enforcers of the regulations. The MMMD must have seen these institutions as the key stakeholders in artisanal mining: the RDCs as the main administrators of rural areas, RBZ as the sole buyer of gold in the country and the Mining Commissioner as the department that would grant the mining claims. The Inspector of Mines and police would enforce the regulations while the Department of National Parks and Wildlife was roped in as a lot of panning occurred in National Parks.

SI 275/1991 empowered local authorities to control and regulate small-scale alluvial gold-mining by making it the responsibility of RDCs to enforce the regulations.[160] The SI 275/1991 served to regulate the extraction of gold from public streams at the local level as well as to regulate the marketing of panned gold: a good indication that the Ministry understood that there was a need to regulate the entire value chain of gold in order to formalize the activity. RDCs were given the right to apply for special grants[161] for particular streams from the Permanent Secretary for Mines and Mining

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157 The earliest recorded estimate of ASM population is found in a newspaper article (The Insider, Gold Panning along public streams now legal, December 31 1991) which quotes Giles Munyoro of the Small-Scale Miner's Association is quoted as saying there were about 100,000 panners in the country.

158 (Wolff, 1993)

159 (Svotwa & Mtetwa, 1999)

160 (Zwane, Love, Hoko, & Shoko; Hilson G. , 2001)

161 A special grant is a licence granted by granted by the Minister of Mines and Mining Development to a person/organization wishing to mine or prospect within an area reserved against prospecting or pegging.

Development or a Mining Commissioner who would consult with the Department of Natural Resources[162].

After acquiring the special grant, the RDC would demarcate a public stream into 50 meter-sections for local residents in consultation with the Mining Commissioner[163]. The regulations required that mining take place only in the riverbed, and not closer than 3 metres to either bank. Environmentally degrading activities such as undercutting[164] and deep excavations (deeper than 1.5 metres) were prohibited. The regulations also required that all mined out areas must be backfilled and that the recovered gold be sold to RBZ or its agents. The environmental regulations were insufficiently enforced and this came under the spotlight in the early 90s following the Brundtland Report[165]. Environmentalists criticized SI 275/1991 for not being strong enough on environmental issues. One issue that was cited was that RDCs were not required to consult with any of the water resource-management bodies when applying for Special Grants.[166] Maponga and Mutemererwa (1995:22) refute the functionality of the regulations stating "*the regulations have been difficult to enforce and are also in direct contradiction with the Natural Resources Protection Regulations of 1991*[167]." This hints that the law's environmental components were insufficiently enforced, if enforced at all. The marketing components of the regulations were unintentionally scuttled by FPR's policies during that time which were geared at promoting LSM and did not consider ASM as a significant source of gold.

Despite these protestations and the promulgation of the Environmental Management Act of 2002 these regulations were in existence until 2006 when they were repealed and ASM criminalized. The stated reason for repealing them was that they were promoting environmental regulations at the expense of the ASM sector. However we have gathered information from KIIs that the growth of the black market and shunning of FPRFPR by ASM producers led policymakers to believe that, through SI 275/1991, the ASM sector was free to produce gold which however did not benefit the State as it ended up on the black market. The repeal faced no objections from the RDCs and the RBZ who had failed to enforce the regulations.

The key causes for the failure of SI 275/1991 to fully address the gold mining and trading by ASM lie in the two key institutions who were supposed to enforce it: the law's environmental restrictions made it difficult for the RDCs to be effective (as did its unclear reluctance to register ASM sites), while FPR's policies during that time unintentionally scuttled the law's attempts at formalizing trading.

Rural District Councils:

RDCs had shown 'limited' enthusiasm and this reluctance to enforce the regulations may partly be due to the lack of knowledge about long-term benefits of monitoring ASM activities.[168] In 2003 there were about 30 RDCs in which intense gold panning was taking place and for which the RDCs should have sought special grants however only nine special grants had been issued. This was theoretically a capacity issue in the form of a lack of development planning knowledge and lack of willingness to enforce the law compounded by the RDCs perception that ASM activity did not directly benefit the

[162] *Section 3, sub-sections 2 and 3*

[163] *Section 4, subsection 2*

[164] *Excavating the banks from beneath thereby causing them to collapse*

[165] *Brundtland, G. (1987). Our Common Future: Report of the World Commission on Environment and Development. Oslo: United Nations.*

[166] *(Maponga & Mutemererwa, Management of natural resources and environment in Zimbabwe: the case of gold, 1995)*

[167] *These regulations were repealed by the Environmental Management Act of 2004*

[168] *(Maponga & Ngorima, 2003)*

RDCs. Thus despite legislation, panning was never fully incorporated into formal economic activities and did not receive much needed support from formal structures within the country.

The Councils also felt that the clause that prohibited mining deeper than 1.5m or closer than 3m to either bank were are not practical because illegal panners would still come and work on these areas and, as a result, the regulations were making it harder for RDCs to police the artisanal miners and making it less of an incentive for artisanal miners to operate legally.

Reserve Bank of Zimbabwe

The RBZ through its subsidiary, FPR, only accepted gold deposits of 50g and above when SI 275 was in force. FPR contends that this was because this is the minimum quantity for purity testing. However, the deposit limit discouraged gold panners and other small-scale miners who produced smaller amounts of gold from selling through the one official channel. The few miners who did market their gold through FPR also had to contend with a time lag between deposition of their bullion and payment (which was by a crossed cheque[169]).This time lag could be anything up to two weeks – something which encouraged artisanal and small-scale miners to sell through the black market in situations where they were hard-pressed for cash. Due to the RDCs reluctance to obtain special grants, the majority of gold panners were operating illegally and could not sell their gold through the official channels.[170]

Ministry of Mines and Mining Development

While the MMMD and Mining Development had promulgated SI 275/1991 which RDCs enforced, it also issued its own gold panning licences. This led to confusion especially in Districts where there was overlap between central and local government licences.

The significance of SI 275/1991 was such that local Government officers were able – for the first time – to have autonomous licensing powers in the gold extraction sector. This not only overturned the colonial legacy in the sense that district Governments were being empowered in the context of minerals development – a sector that was historically controlled by a small number of centralised decision-makers; it also overturned the colonial policies that forbade independent gold extraction by black African workers.[171]

Despite its many flaws the SI 275/ 1991 had provided artisanal miners with an opportunity to spend more time working on issues related to operational, environmental, economic and marketing efficiency, rather than trying to evade the police. The decision to repeal the Regulations was accompanied by a decision to register all toll elution plant operators, a move to tighten control of the gold production chain. The police swiftly moved in to enforce the decision through 'Operation *Chikorokoza Chapera*' (discussed more in section 3.2 below).

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[169] *A crossed cheque is a cheque that has been marked to specify an instruction about the way it is to be redeemed. A common instruction is to specify that it must be deposited directly into an account with a bank and not immediately cashed by a bank over the counter. By using crossed cheques, cheque writers can effectively protect the cheques they write from being stolen and cashed.*

(http://www.investopedia.com/terms/c/crossedcheck.asp)

[170] *(Drechsler, 2001)*

[171] *(Spiegel, 2012)*

Mines and Minerals Amendment Bill

There have been attempts to amend the MMA. In November 2007 the Mines and Minerals Amendment Bill was tabled. The Bill has been shelved and signs are that it will never be enacted but it provides an insight in the potential changes in legislation.

The Bill differentiates between large-scale miners and small-scale miners. A small-scale miner is defined as a miner who, in any mining location or combination of mining locations held by him or her:

- employs a total of less than one hundred persons;
- has an installed electrical or mechanical power capacity of less than 7,5 megawatts; and
- produces or processes annually less than 30 000 tonnes of ore and mining waste as a result of his or her mining operations.

An interesting clause is one on environmental management: the Bill states that small-scale miners will have the option of establishing their own environmental rehabilitation funds or of contributing towards a fund established by a financial institution or a trade body; if they do not exercise that option, they will have to pay contributions to the Environment Fund established by the Environmental Management Act. This has been attempted in Sierra Leone but did not succeed.

Additionally among the changes to the MAB proposed by the Bill, one change is the requirement that one member of the Board be selected by the Minister from a panel of at least three names submitted by an association which, in the Minister's opinion, represents the interests of small-scale miners in Zimbabwe. This suggests that there is some interest in ASM representation in discussions that affect them.

3.1.3. Other Statutory Instruments under the MMA

Mining (Management and Safety) Regulations of 1990, S.I. 109/1990

S.I.109/1990 regulates the appointments of mine managers and the safety of mining operations. These regulations are however one-size-fits-all law for all scales of mining operations despite the fact that ASM operations usually cannot afford to appoint a mine manager or adhere to the rigorous safety requirements. The Government also lacks the capacity to perform its duties fully with regards to inspections of mining operations. However one of the stated goals of the recent restructuring of the MMMD is to ensure safety at all registered mines which has seen the recruitment of quite a large number of graduate trainee engineers recently.

Explosives Regulations, S.I.72 of 1989, Chapter 10:08

These regulations deal with the licencing of mine blasters and the use, storage, transport and manufacture of explosives. While some ASM operations use explosives, most of these operations acquire explosives on the black market and are neither licenced to have blasting operations nor employ licenced blasters.

Mines and Minerals (Custom Milling Plants) Regulations SI 329 of 2002; SI 178 of 2006

These regulations require every Custom Milling Plant to be registered. They were enacted in 2006 when artisanal mining was criminalized as a way to seal leakages of gold from milling sites to the grey market. The milling licences are valid until the 31st of December every year and must be renewed thereafter. Millers have complained that the licence fee is too high and indications are that many millers are currently operating without licences. In addition to the licence fee the millers are required to obtain an Environmental Impact Assessment (EIA) Certificate.

3.1.4. Other Acts that impact the ASM sector

Legislation / Policy	Scope of law/policy (What does it say?)	What other laws/policies does it interact with?	Relevance of law/policy (high, moderate or low relevance	Regulatory Institutions
Environmental Management Act Chapter 20:27 of 2004	The Act provides for the sustainable management of natural resources and protection of the environment; the prevention of pollution and environmental degradation; the Preparation of a National Environmental Plan and other plans for the management and protection of the environment; the establishment of an EMA	Parks and Wild Life Act [Chapter 20:14]; Rural District Councils Act [Chapter 29:13]; Income Tax Act [Chapter23:06] (all proceeds collected as Carbon Tax are given to EMA); Criminal Procedure and Evidence Act [Chapter 9:07]; Regional, Town and Country Planning Act [Chapter 29:12];	High	Minister of Environment, Water & climate; National Environment Council, EMA headed by the Director General
Zimbabwe National Water Authority Act (Chapter 20:25) of	This Act established the Zimbabwe National Water Authority (ZINWA) which manages the country's water resources and charges for the provision of water and other related services. ZINWA also collects a water levy.	Water Act (1976) Amended	Low	MEWC

Rural District Council Act (Chapter 29:13) of 1996	The function of RDCs include, formulating and enforcing by-laws, determine and collecting rates and levies, local development, provision of social services and environmental conversation.	Traditional Leaders Act (chapter 29:17) of 1998; Communal Land Act; Rural Land Act	High	MOLG
Mining (General) Regulations) Government Notice 247 of 1977	This SI considers the use of indigenous wood and timber; indicator beacons and D.P. pegs: roads, railway tracks and inaccessible ground; preservation of mining rights and payment by miner of 'designated mineral' levy; payment of landowners and preservations of works.	EMA Act	High	MMMD
Mining (Health and Sanitation) Regulations SI 182 of 1995	It regulates the provision of adequate health and sanitation facilities on a mine. It is rarely applied to small-scale and artisanal miners since some of the facilities are non-existent and ASM are usually not legally charged for failure to provide facilities to their workers.		High	MMMD; MHCW; EMA

Gold Trade Act	Current legislation (Gold Act Trade Chapter 21:03) singles out the RBZ through FPR, as the sole buyer of gold in the country. RBZ dictates the gold price.	Mines & Minerals Act (MMA)	High	MOF; FPR under RBZ
Gold Trade (Gold Buying Permits for Concession Areas) of 2002	The stated objective of these regulations was to tighten loopholes in the mining, processing and trading of gold and other minerals by establishing concessions	Mines & Minerals Act (MMA)	High	MOF; FPR under RBZ

3.2. Key Policies:

3.2.1 Artisanal Mining Permits (AMPs)

The introduction of Artisanal Mining Permits (AMPs) as a mitigation measure to curb the selling of gold onto the parallel (grey) market and its subsequent smuggling as announced by Hon. Walter Chidhakwa, Minister of Mines and Mining Development, allows 'anyone' interested in dealing with gold and selling to FPR. This is a welcome move for ASM gold producers as these AMPs are issued free of charge through gold service centres, FPR and licensed millers' offices. Thus ASM gold producers can easily sell their gold produce to FPR as long as they have their AMP. Although this was introduced on 18 November 2014, it could be a success in the process of formalising ASM operatives as it is a form of 'licensing' of artisanal miners, to bring order to the small-scale gold sector, and enable FPR to channel all the gold currently in the hands of informal and unregistered miners.

3.2.2 The role of the State as a regulator of ASM operations

There are six government ministries that directly engage with ASM.[172] The MMMD and Mining Development (MMMD) overseeing the mining industry liaises with other Ministries like the MOF on the minerals tax regime; MEWC on environmental management systems; Ministry of Health and Child Welfare (MHCW) on occupational health and safety issues; Ministry of Defence (MOD) on defining strategic precious minerals and state security and MOLG on engaging councilors and traditional leaders who are in contact with ASM communities at grass root levels. The most engaged is of course the MMMD. It has been constantly observed throughout the course of the scoping study that lack of coordination and information sharing among the different Ministries contributes to the challenges they face both individually and collectively. This is further compounded by the lack of a National Mineral Policy which could provide a strategic guidance to the Ministries and could support this much-needed coordination.[173]

The diagram below shows the different Ministries and institutions that engage with ASM and their degree of influence. The degree of influence decreases as you move from left to right.

[172] *(Moyo F. , 2014)*

[173] *(Mutsinya, 2013)*

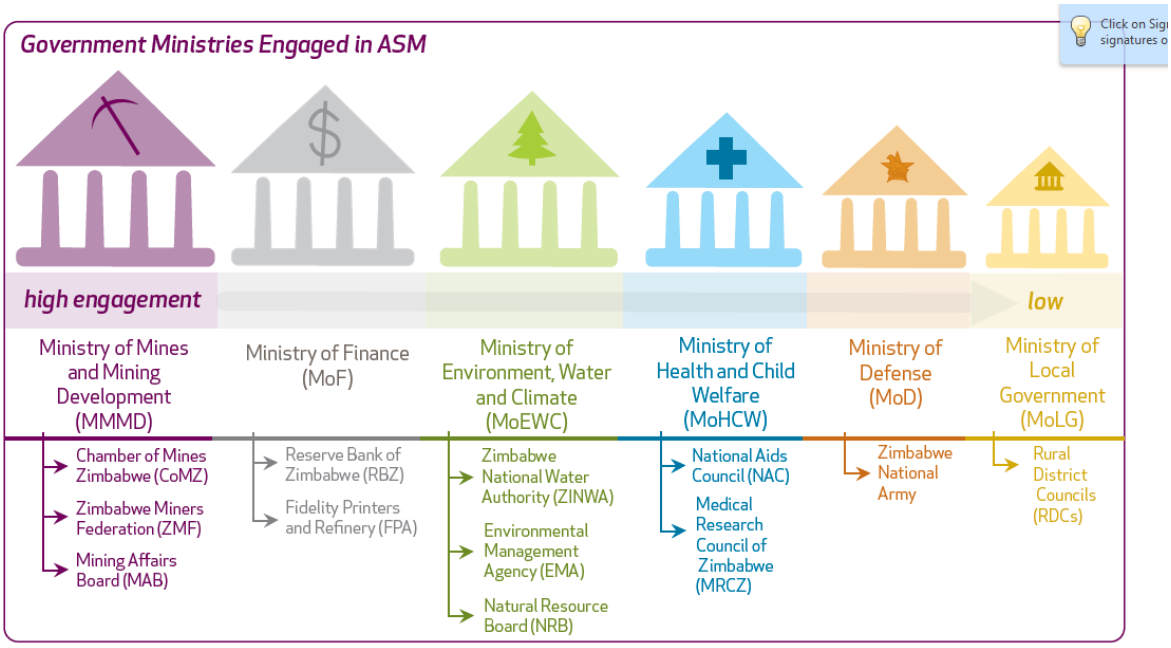

Figure 7: Ministries engaging with ASM (refer to list of abbreviations)

Zimbabwe has no official National Mineral Policy document and a concise Strategic Mineral Plan for the next 50 to 100 years is still to be put in place. However government has taken bold steps and recently came up with a draft Minerals Policy.

3.2.3. Draft Minerals Policy

Zimbabwe's Draft Minerals Policy (DMP) outlines the broader mining vision, guidelines and aspirations of the government of Zimbabwe as far as mining is concerned. Of the policy's six goals, three have a direct impact on ASM and these are:

- Prescribe procedures for the procurement of mineral leases in a manner that is transparent, fair, honest, cost effective and competitive;
- Implement a mineral fiscal regime that optimises returns to the asset owner (the state) whilst still remaining attractive for investments by the operators - the draft policy explicitly states that "*taxes, tariffs and fees that add to the cost of mining will be minimised to encourage the optimal extraction of the resource and to discourage ''high-grading'*; and
- Facilitate small and medium scale mining, including support for mechanisation.

The DMP is progressive as it recognizes three tiers of mining: large-scale, small-scale and artisanal. While it is still to be adequately determined how the Government distinguishes between small-scale and artisanal mining (if at all it does), the DMP states that a new law, the Minerals Development Act, will be formulated. The Act will cater for exploration licenses and ASM prospecting licences, ASM leases, and Mining Leases on a use-it-or-lose-it principle[174] The DMP calls for support and enabling of sustainable ASM activities to create employment, generate income and help reduce poverty in the

[174] *This is a government policy whose stated objective is to attain 'effective and efficient allocation and management of mining titles, as well as active exploration of minerals' by discouraging the holding on to concessions for long periods of time while not using them. This will allow serious investors (both local and international) and/or more players to be involved that's accelerating growth in certain sections of the minerals industry.*

rural areas through rebuilding the ASM support 'golden triangle' of finance, marketing and technical support. The DMP makes a provision to *"establish mechanisms for the arbitration of competing land use options."* This is critical as gold is predominantly found in rural and peri-urban settings where indigenous communities engaging in agricultural activities often clash with migratory artisanal miners who often degrade farming land and leave it un-rehabilitated. Additionally, the DMP calls for the establishment of a functional and user-friendly national Mineral Cadastre Information Management System (MCIMS) and this will go a long way toward minimizing land-use conflicts and disputes over claims. The DMP however remains a draft and currently Government is informed by the five year economic blueprint, Zim ASSET.

3.2.4. Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim-Asset)

Zim-Asset's stated goal is to achieve sustainable development and social equity anchored on indigenization, empowerment and employment creation. The Policy lists two of its outputs as: eight Provincial Gold Processing & Buying Centres and the registration of 500 syndicates (2500 registered small scale miners). The policy states 'small-scale miners' but government is directing these efforts towards artisanal mining which again highlights the lack of clarity over the Government's distinction between artisanal and small-scale mining. Zim-Asset calls for formalization of small-scale miners (it is silent on artisanal miners). However the process is limited to syndication or formation of cooperatives.

3.2.5. Recent ASM Policy Pronouncements by Minister of Mines and Mining Development

On the 14th of November 2014, the Minister of MMMD released a press statement titled, '*Measures to increase gold production and effectively account for sales to FPR in the short, medium to long term.'* The Minister focused on both small-scale and large-scale gold producers.

The Minister identifies three factors that have negatively affected the viability of gold mining, namely:

- Strict regulatory requirements;
- Numerous mining taxes; and
- Stringent environmental regulations.

He also identified challenges that have hindered deliveries to FPR which include:

- Sustained decline in the international gold price since January 2013;
- Endemic smuggling of gold to neighbouring countries, whose illegal buyers are getting a premium estimated at 14%[175];
- High regulatory fees and levies;
- The inconvenience of selling gold at FPR gold buying centres; and
- Lack of effective enforcement of existing regulatory requirements with regard to artisanal gold production and sales – the current enforcement operations are fragmented, uncoordinated and individualistic.

To address these and other challenges the Minister outlined short, medium and long-term measures, which include:

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Short-term measures:

- Establishment of a Gold Compliance and Enforcement Coordinating Unit (GCECU): this will be comprised of the following organizations – MMMD, MoFED, RBZ, Office of the President and Cabinet, Zimbabwe Republic Police (ZRP) Minerals Unit, Ministry of Local Governance, EMA and ZIMRA. GCECU will report directly to a Body of Permanent Secretaries.
- Establishment of Gold Service Centres – the first gold service centre will be jointly funded by Minerals Marketing Corporation of Zimbabwe (MMCZ) and FPR and established at St. George's in Zhombe.
- Establishment of gold mobile buying units – this is aimed at small-scale miners who may find it difficult to travel to FPR buying centres. In addition FPR has been asked to extend their operating hours to create convenience to producers.
- Introduction of Artisanal Mining Permits (AMPs)
- Zimbabwe Electricity Transmission and Distribution Company (ZETDC) registration of Milling Plants. As a way of ensuring custom millers are registered, ZETDC, the national electricity supplier, will be required to ensure that a custom miller is registered and licenced before connecting them to the power grid.
- Accounting for gold output in small-scale sector – the use of consumables will be monitored to estimate gold produced by each small-scale miner. These consumables include electricity, water and cyanide. In an interview, the former Minister of Finance, Tendai Biti, revealed he had once sought to engage an international firm to do similar accounting for large scale mines.
- Technical Capacity Building – the MMMD mandated the Zimbabwe School of Mines (ZSM) to develop programs with the objective of providing training on technical aspects to small-scale miners. In addition, MMMD and EMA are embarking on an outreach program to educate the small-scale miners on methods of improving gold production in a sustainable manner.

Medium to Long-term Measures

- User-friendly EMA guidelines – MMMD is engaging EMA with the view of coming up with environmental guidelines for artisanal and small-scale miners which will ensure a balance is struck between viability and environmental management.
- Review and rationalization of EMA, RDC and Electricity charges – the MMMD is engaging the MOF with a view to standardize charges by various RDCs and EMA.

The press statement states that FPR is receiving an estimated 2 tonnes a year from the small-scale sector. The Minister believes an additional 5 tonnes per year can be generated: *"if each miller delivers 2kgs of gold to FPR per month, over 300 millers will produce 600kgs x 12 months = 7.2 tonnes per year – effective mobilisation of an additional 5 tonnes per year."*

This is worryingly similar to the justification made by the then Governor of the RBZ, Dr Gideon Gono, for Operation *Chikorokoza Chapera* who estimated that about USD50 to 60 million of gold was being smuggled out of the country per month. One key informant revealed that the Governor had arrived at this figure after being misinformed by an overzealous individual seeking a gold buying licence that there were 1.5 million artisanal and small-scale miners in Zimbabwe, each of whom recovered 5g of gold a day.

Such generalizations are worrying as they build expectations that might not be realized, expectations that do not account for the numerous factors that affect gold production in the country.

Chapter 4: Research Findings

This chapter provides descriptive information of the demographic and social economic situation of artisanal and small scale gold miners and traders in Zimbabwe. The chapter also provides information about gold mining particularly on production, processing and trading. Furthermore the chapter gives a description of legal and regulatory framework for artisanal and small scale gold mining and trading, environmental impact and child labour issues. The descriptive results are triangulated with qualitative information from the KIIs and FGDs to bring about a broader understanding of the phenomena. The data presented in the tables include frequencies and percentages by column presented in brackets.

4.1. Demographic information

The baseline survey had 628 respondents (M= 442, F = 186) for the household questionnaire. This included 354 miners and 274 non-miners households (control group). 89% of miners were male while only 11% were female. The proportion of female miners (11%) is far below the estimate of 30% of the total number of artisanal miners recorded in literature by Drechsler (2001). By comparison, the gender proportions in the control group were 53% women and 47% men. The baseline survey results show that miners are less likely to be divorced or widowed than non-miners. The average of the miners was 39, slightly older than the average age of the non-miners at 37. There is no statistical difference between the average number of children (4.8) for miners and non-miners. Each family (both miners and non-miners) has on average one child below the age of 5yrs, while miners have, on average, slightly more (0.8) children between the ages of 5 and 9 than non-miners (0.6).

The miners interviewed in this survey were rather better educated than the non-miners. This is shown by the fact that three quarters of miners have completed secondary education as compared to 69% of non-miners. It is interesting to note that both of these groups have much higher statistics for the completion of secondary education than the national average of employed Zimbabweans having done so (29%[176]). There exists no difference in the proportion of miners and non-miners who have received tertiary education with a few individuals (0.03%) in each of the groups having done so. 3% of miners had no education.

Most miners are married (78% of men and 62% of women). This dispels the notion that the majority of miners are single young men as only 18% of male miners in this survey were found to be single. Only 5% and 2% are divorced and widowed respectively. Curiously, none of the male miners reported to be widowed though 4% are divorced. Out of the miners who responded to the survey; 1% were children (age below 18 years old). It should be noted that having only 1% of respondents under 18 years of age is not indicative of levels of child labour, rather it is a reflection of Pact's child engagement and protection policies as described in the methodology.

Of the miners, 70% were engaged in ore extraction, 5% were hoisters, 3% were crushers, and 10% performed other duties in mining. Other roles outside of actual mining were reported by between 0% - 2% of respondents.

In addition to the miners, 47 millers/traders responded to the millers/traders questionnaire. Out of those, 13% are women and 87% are men. The figure below shows the proportion of millers by age range.

[176] *ZIMSTAT 2011 Labour Force Survey*

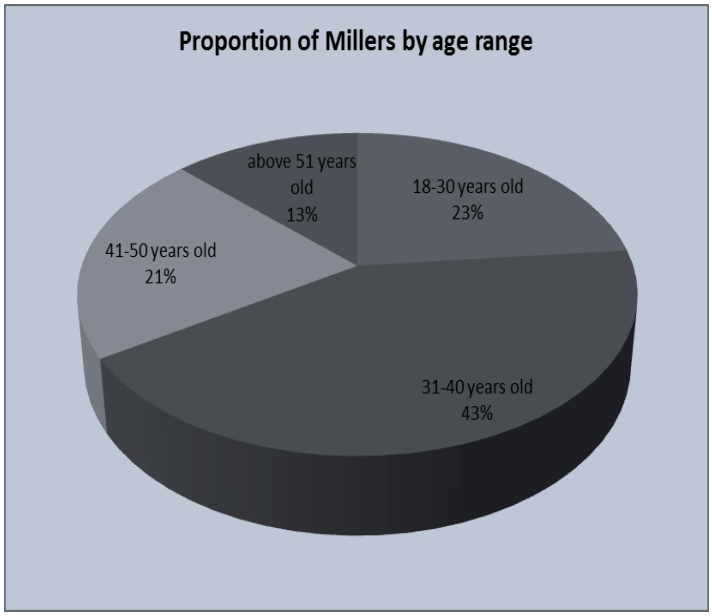


Figure 8: Pie chart showing the proportion of millers by age range

4.2. Mapping actors, production and mineral flows

4.2.1. Key players in Zimbabwe's artisanal and small scale gold mining

Gold Mining

In order to understand the characteristics of ASM, the survey looked at various issues pertaining to working conditions as determinants of effectiveness and efficiency in production. The issues considered within working conditions included legal status of the artisanal and small scale mines, miners' membership in associations and reasons for those that reported not being members of miners association. Other information collected was on the mining calendar, miners' work schedule, training, skills and experience in the sector. Gold production information was also collected including tools used in gold production, quantities of ore extracted and gold yield per tonne of ore, gold processing, inputs and consumables involved in production as well as closing gold mining operations. This section therefore presents the results of the above mentioned issues and, where relevant, tests of significance of the presented findings.

The diagrams below map the stakeholders that were identified to be involved in the different phases of ASM:

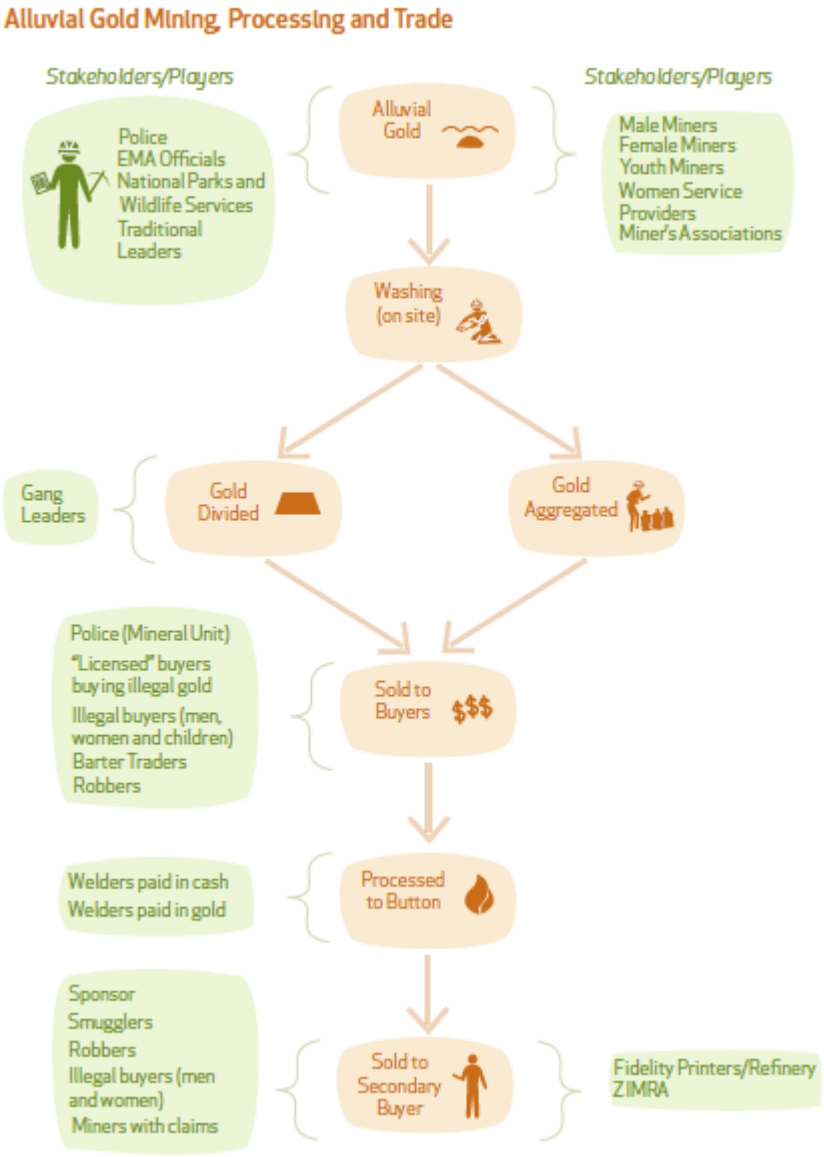


Figure 9: Stakeholders involved in alluvial mining

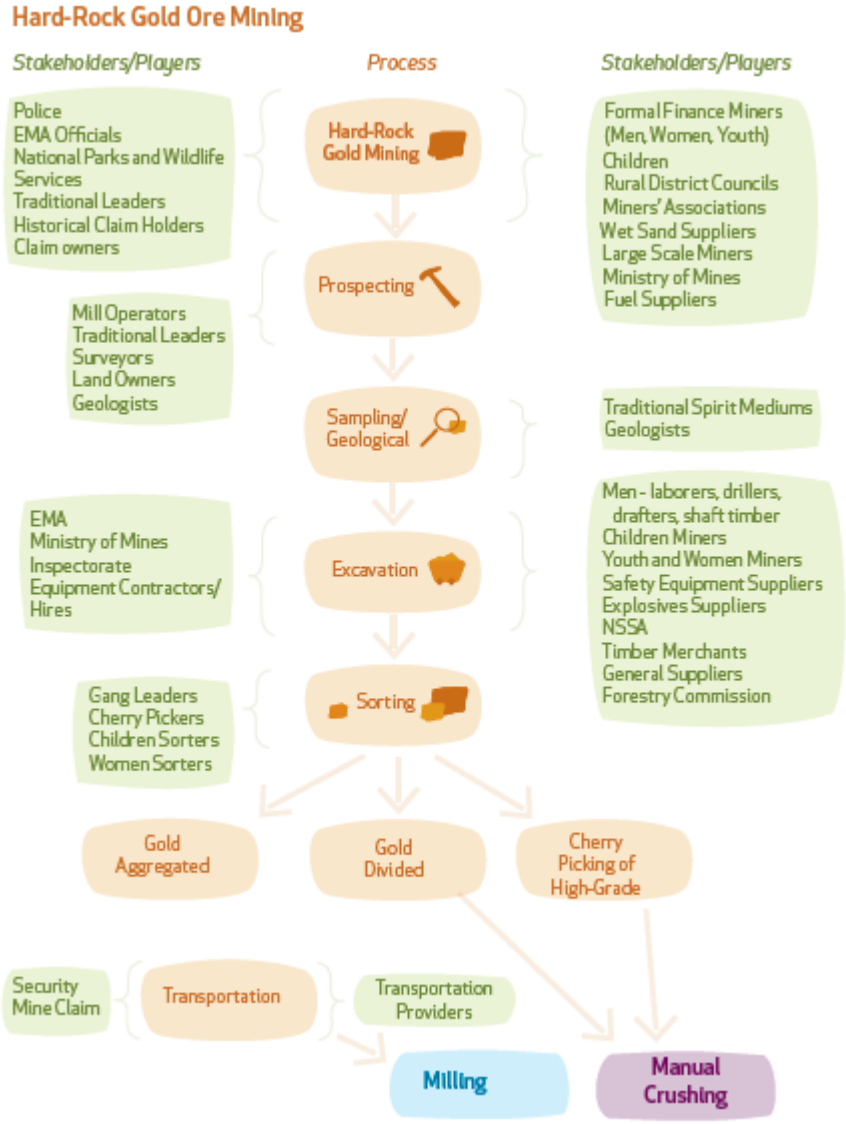


Figure 10: Hard-rock mining

Legal and physical status of the mines

Most miners are working on registered claims with valid licences. 81% of mining activities are hard-rock mining, 13% are alluvial mining activities and 11and1% are a mix of hard rock mining and alluvial mining operations while only 22% are re-treating of dumps. Consistent with ASM in other countries, alluvial mining consistently lags in legalization. The predominant source of water in mining areas is machine-drilled wells (11%) and hand-dug wells (77%). Just under half of the miners abandon operations without any reclamation though a quarter of them backfill and 15% fence off the pits showing that there is need to raise awareness of the long term environmental impacts of abandoning mine sites without reclaiming them.

Figure 11: A typical ASM mine shaft

Membership of associations

The survey also looked at the membership of miners' and millers' associations as one form of formalization/organization within ASM and gold trading. For the miners who reported not being members of miners association, the survey sought to understand reasons for this. The results show that over 80% of miners (both men and women) say that there are no miners associations in Shurugwi. It is also worth noting that 7% of women in Kadoma reported gender discrimination as being a reason for not being members of a miners' association. Another 35% of men and 53% of women in Kadoma gave other reasons which included lack of awareness or knowledge of how associations operate or the benefits of being members. Other reasons given were lack of transparency and trust within organizations, lack of opportunities including restrictions from mine owners and lack of interest. Others simply didn't have time or money for membership.

Work schedule

To understand the commitment of miners to the sector, the survey collected information on the mining calendar, the duration that miners have been mining, as well as how long they planned to stay in mining. The results show that mining is an all year activity for around 70% of men in both study areas. A significant disparity was seen between the study areas for women. In Shurugwi 70% of women in mine throughout the year while 13% are seasonal miners who mine during the dry season. In Kadoma27% and 42% of women are full-time and seasonal miners respectively. It was also interesting to note that 15% of women in Kadoma reported mining as an activity only for during the rainy season, a period which the majority of miners considers as the most difficult, dangerous and costly in terms

of flooding of mining shafts and pumping water from the shafts. The figure below provides a summary of responses for mining calendar by district and sex of respondent.

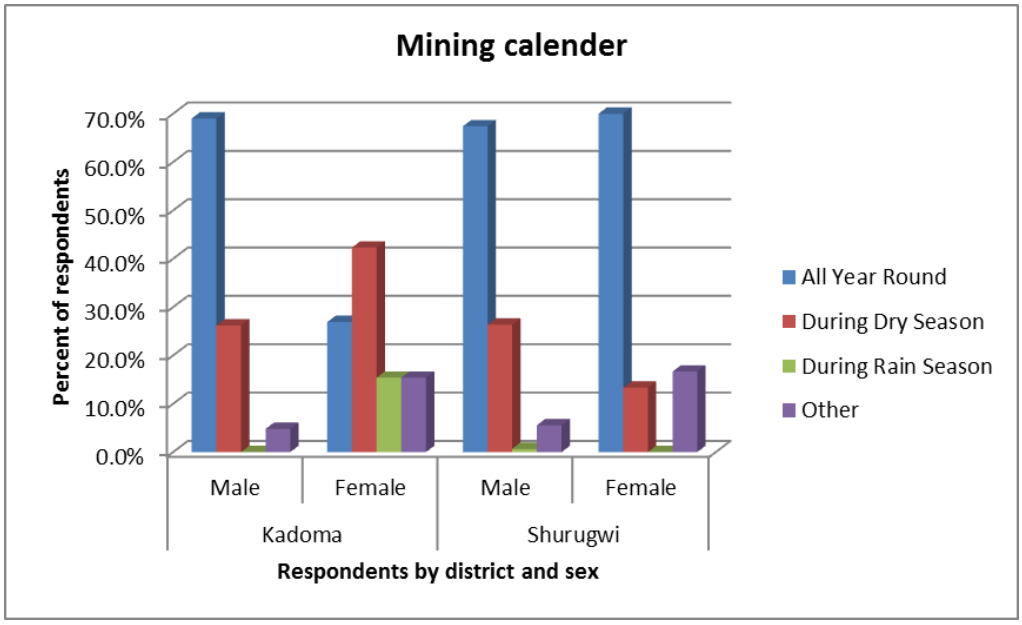
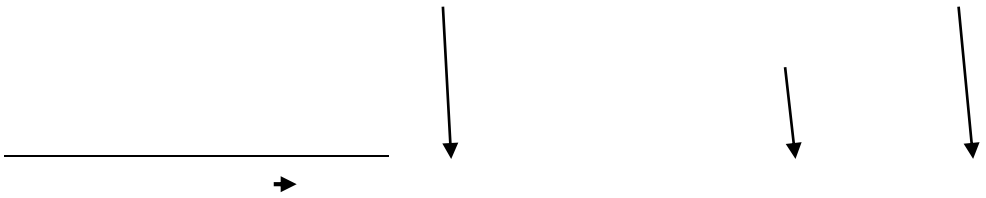


Figure 12: Mining calendar disaggregated by location and sex

The box below discusses the impact of rainfall on ASM: Impact of Rainfall Patterns on ASM

Many key informants mentioned that rainfall has an adverse effect on the output from ASM. Using the average rainfall for Zimbabwe (1900 – 2009)[177] and comparing it to ASM deliveries to FPR between January 2009 and September 2014, it can be seen that there is a moderate correlation (*r=0.3)*.

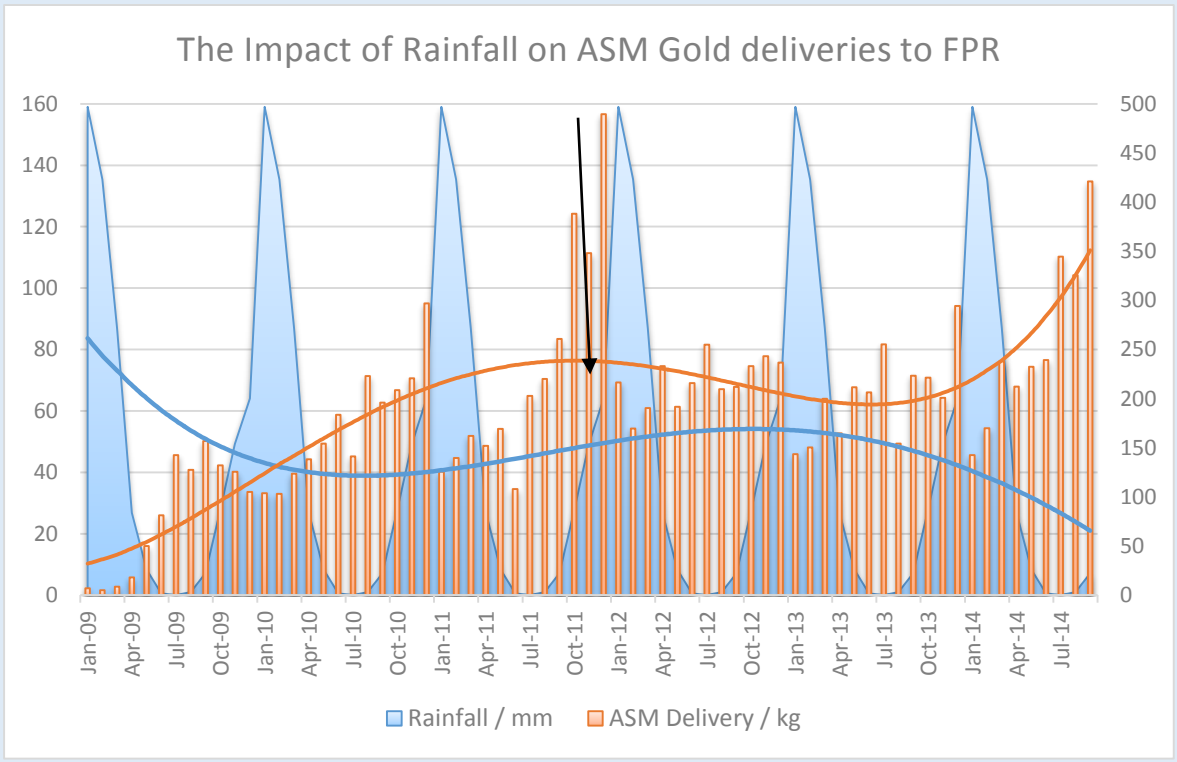
The coefficient of determination is 0.09 meaning only 9% of the variation in ASM gold deliveries is attributable to variations in rainfall. While this might seem minimal, a closer look reveals that the impact of rainfall is concentrated over just one month i.e. January which represents only 8.3% of the entire year. (Note that 9% and 8.3% are statistically equivalent with a 95% degree of certainty). This is confirmed by the significant decline in ASM delivery every January[178] as shown by the black arrows in the graph below:



[177] *Source: World Bank*
http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=Africa&ThisCCode=ZWE

[178] *It is important to note that January is also the month when most royalty revisions are conducted and this addressed below.*

Table 5: Sources (World Bank and FPR)



Enquiries into miners' work schedule also show that miners generally work beyond the standard 40-45 working hours per week prescribed by the labour laws. Over half of all miners reported working between 41-60 hours per week while a fifth reported working between 61-100 hours and around a quarter of all miners reported that they don't have time limits but they work until targets are met.

Miners training, skills and experience

In terms of skills[179] relating to mining work; 70% of miners reported having no skill. Out of those miners who reported having no skills, over 4% have reported learning mining through being trained by their colleagues in the mines though over half have had no training of any sort. Only 6% reported having been exposed to some form of formal training.

[179] *The baseline survey classified the different skill levels of jobs into three: unskilled, semi-skilled, and skilled. This classification is based on how long it takes to learn the work and the qualities and characteristics of the specific job. Unskilled work requires little or no judgment to perform simple tasks and can usually be learned in less than a month. Unskilled work often requires strength, but not always. Semi-skilled work requires some skills but doesn't include complex job functions. Semi-skilled work usually requires the ability to remain alert and pay attention to detail and/or protecting against risks. It usually takes between three and six months to learn a semi-skilled job. Skilled work requires specific qualifications, the use of judgment, and knowing how to perform mechanical or manual tasks to create a product or material (or provide a service). Skilled work may also include reading specifications, measuring, estimating, and making calculations. Skilled work can include jobs that require a person to work closely with others, or with figures, facts, or ideas that require complex, abstract, or critical thinking. It takes at least six months and often many years to train for and learn a skilled job.*

In terms of length of time that miners have been in their current mine; around three quarters of miners have been in their current mine for 3 years or less while 9% have been working in the same mine for over 10 years. A tenth of the miners who reported being in the same mine for over 10 years had all received some training from their colleagues in the mine

Overall 65% of miners expressed their commitment to mining by reporting that they would stay in mining for as long as mining exists.

Table 6: Miners training, skills and experience Gold Production

		Training received for your role							
		Professional training	Vocational training	Training on the job by others at the mine	Training by a 3rd party project	Training by government agents	No training	Other	Total
Skills in relation to mining	Geologist	1	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)
	Mining engineer	2 (7.4)	1 (9.1)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (1.1)
	Technician	2 (7.4)	0 (0.0)	3 (1.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	5 (1.3)
	Certified blaster	3 (11.1)	5 (45.5)	4 (2.5)	0 (0.0)	3 (23.1)	0 (0.0)	0 (0.0)	15 (4.0)
	Driller	2 (7.4)	0 (0.0)	13 (8.2)	0 (0.0)	1 (7.7)	12 (7.6)	0 (0.0)	28 (7.4)
	Driver	1 (3.7)	0 (0.0)	3 (1.9)	0 (0.0)	1 (7.7)	0 (0.0)	0 (0.0)	5 (1.3)
	Equipment operator	4 (14.8)	0 (0.0)	10 (6.3)	0 (0.0)	2 (15.4)	1 (0.6)	0 (0.0)	17 (4.5)
	Administrator	4 (14.8)	0 (0.0)	6 (3.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	10 (2.7)
	First aid	2 (7.4)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	2 (1.3)	0 (0.0)	5 (1.3)
	No skill	4 (14.8)	1 (9.1)	106 (67.1)	3 (50.0)	5 (38.5)	140 (89.2)	3 (60.0)	262 (69.5)
	Other	2 (7.4)	4 (36.4)	12 (7.6)	3 (50.0)	0 (0.0)	2 (1.3)	2 (40.0)	25 (6.6)
Total		**27 (100)**	**11 (100)**	**158 (100)**	**6 (100)**	**13 (100)**	**157 (100)**	**5 (100)**	**377 (100)**
Time in your current job	0 - 6 months	6 (22.2)	3 (27.3)	61 (38.6)	2 (33.3)	7 (53.8)	59 (37.6)	3 (60.0)	141 (37.4)
	7 - 12 months	3 (11.1)	2 (18.2)	25 (15.8)	1 (16.7)	0 (0.0)	23 (14.6)	0 (0.0)	54 (14.3)
	1 - 3 years	12 (44.4)	2 (18.2)	29 (18.4)	1 (16.7)	2 (15.4)	36 (22.9)	0 (0.0)	82 (21.8)
	4 - 5 years	4 (14.8)	0 (0.0)	16 (10.1)	0 (0.0)	1 (7.7)	15 (9.6)	1 (20.0)	37 (9.8)
	6 - 10 years	1 (3.7)	1 (9.1)	11 (7.0)	1 (16.7)	2 (15.4)	13 (8.3)	1 (20.0)	30 (8.0)
	Over 10 years	1 (3.7)	3 (2.7)	16 (10.1)	1 (16.7)	1 (7.7)	11 (7.0)	0 (0.0)	33 (8.8)
Total		**27 (100)**	**11 (100)**	**158 (100)**	**6 (100)**	**13 (100)**	**157 (100)**	**5 (100)**	**377 (100)**
How long you plan to stay in mining	Less than 1 year	2 (7.4)	2 (18.2)	31 (19.6)	0 (0.0)	1 (7.7)	21 (13.4)	2 (40.0)	59 (15.6)
	1 - 2 years	3 (11.1)	0 (0.0)	20 (12.7)	0 (0.0)	1 (7.7)	23 (14.6)	0 (0.0)	47 (12.5)
	3 - 5 years	4 (14.8)	1 (9.1)	5 (3.2)	1 (16.7)	0 (0.0)	15 (9.6)	0 (0.0)	26 (6.9)
	As long as the mining	18 (66.7)	8 (72.7)	102 (64.6)	5 (83.3)	11 (84.6)	98 (62.4)	3 (60.0)	245 (65.0)
Total		**27 (100)**	**11 (100)**	**158 (100)**	**6 (100)**	**13 (100)**	**157 (100)**	**5 (100)**	**377 (100)**

Mineral Sector Activities

In establishing production statistics for ASM, the survey collected information on types of mining activities carried out in the survey areas, equipment and tools used in production including ownership and consumables for the equipment and tools. Other data was on length of time taken for production, quantity of ore and gold extracted per tonne of ore and other types of minerals mined in the area.

Miners were asked about the type of mineral sector activities that are happening in their area and the table below provides the summary of responses from miners by sex and district.

Table 7: Mineral sector activities

Mining activities in the area		District				Overall Total
		Kadoma		Shurugwi		
		Male	Female	Male	Female	
Mining activities	Alluvial gold mining	6 (32.0)	6 (30.0)	8 (5.6)	4 (13.3)	24 (6.4)
	Hard rock gold mining	120 (64.9)	5 (25.0)	94 (66.2)	21 (70.0)	240 (63.7)
	A mix of alluvial and hard rock gold mining	5 (2.7)	1 (5.0)	21 (14.8)	0 (0.0)	27 (7.2)
	Retreating of dumps	1 (0.5)	1 (5.0)	1 (0.7)	0 (0.0)	3 (0.8)
	Gold processing (manual crushing, sluicing, amalgamation)	3 (1.6)		4 (2.8)		7 (1.9)
	Gold processing (machine crushing, milling, amalgamation)	17 (9.2)	2 (10.0)	3 (2.1)	0 (0.0)	22 (5.8)
	Gold trading	33 (17.8)	3 (15.0)	9 (6.3)	2 (6.7)	47 (12.5)
	Gold jewelry making	0 (0.0)		1 (0.7)		1 (0.3)
	Other activities	0 (0.0)	2 (10.0)	1 (0.7)	3 (10.0)	6 (1.6)
Sub-Total		**185 (100)**	**20 (100)**	**142 (100)**	**30 (100)**	**377 (100)**

The results for type of activities carried out in Kadoma and Shurugwi show that 64% is hard rock gold mining, 13% gold trading, and 7% alluvial gold mining. Moreover 29% of miners reported other types of minerals apart from gold being mined in the area. Three quarters of them reported chrome while one quarter said platinum. Iron was reported by 2% of respondents, copper was reported by 1% and 2% said other minerals.

The most common production method reported was high grading of ores as it was seen as more economical for miners as it has high gold recovery per tonne of ore. A miller in Kwekwe informed the survey team that another method used to recover gold is processing the rubble. This is reported to be fresh ore that is available on the surface, but it's generally low grade (probably a result of sorting). Another method is processing the tailings where it was reported that "*there is also an industry of what has been left over by the previous mine e.g. what they call German shafts. If you find a shaft that was previously mined by the Germans you are most likely to find something that was left behind.*"

Most ASM operations seem to have short development timelines (time taken to produce gold bearing ore from the day the miners start digging the shaft). 65% of respondents reported that it takes less than one month to produce gold bearing ore, a quarter of miners said one to two months, 9% report three to five months, and a small minority of 1% say it takes longer than that.

However these time delays vary widely depending on the site. A key informant interview with a sponsor in Kadoma revealed that it's hard to tell how long it takes to produce gold. The sponsor noted "*most operations you can spend three months digging because they are in exploration phase. At times, the miner will just come across a lump of gold in one dig. Sometimes you can go for months without finding gold ore and at times just a few hours*." There is an undeniable need for geological exploration in ASM to increase efficiency of the operations and this exploration must reach beyond the already well-known gold rich areas. While it can be seen that most miners are working on rich ore bodies as evidenced by the 65% who find gold within a month, they are still operating blind.

A mix of equipment is used with pick-axes, spades, and hammers and chisels being the most commonly used. None of the respondents were found to be using sluices boxes and very few are using bull-

dozers, scrappers or Chilean/round mills. Most equipment is owned by mine owners (55%) and sponsors (15%) while miners themselves only own 13% of equipment. Despite not generally being owners, about have of equipment service is conducted by the miners themselves (47%) and in nearby towns (16%). The miners assessed two thirds of the equipment as mainly old but still in fair working condition while only 8% is new equipment in good working condition. The major inputs in mining are explosives, diesel, lubricants and drilling bits. Mercury is more commonly used by miners than cyanide.

Figure 13; A semi-mechanized mine site

In terms of the ownership of equipment/ tools used in mining, it was also reported that equipment and tools used in mining are owned by mine owners (35%), millers (6%) and miners (33%). Moreover sponsors owned 16% of equipment/ tools while 8% of equipment and tools are rented. Most advanced equipment (compressors, pumps and jack-hammers) are owned by mine owners, sponsors and to a lesser extent millers. This implies that if an equipment purchase/loan program is to be embarked on these are the players to look at for partnering in ensuring the equipment reaches its intended beneficiaries.

Figure 14: A compressor used by ASM miners

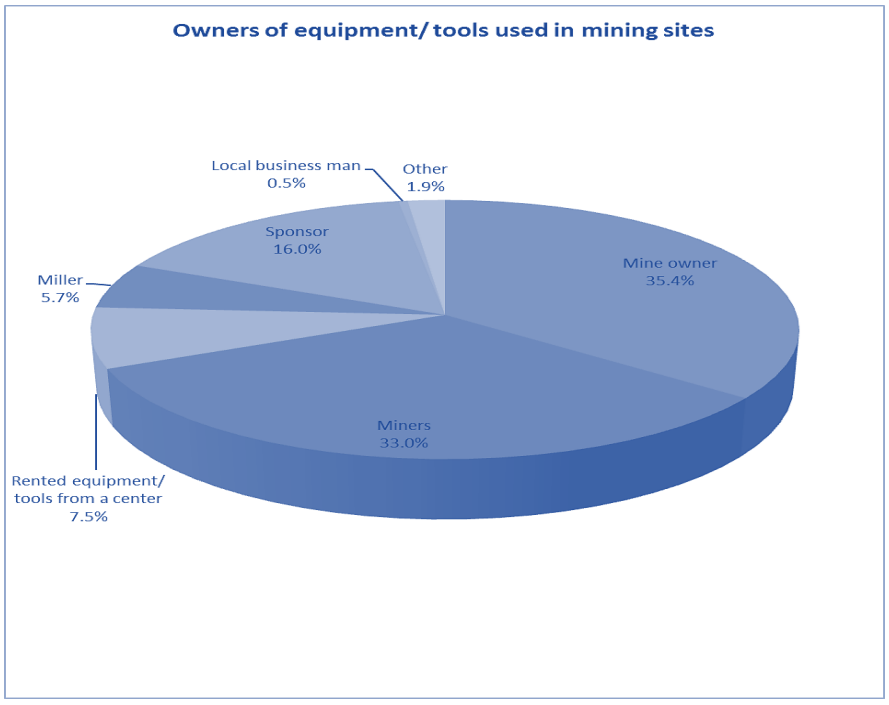


Figure 15: Owners of equipment/tools used in mining sites

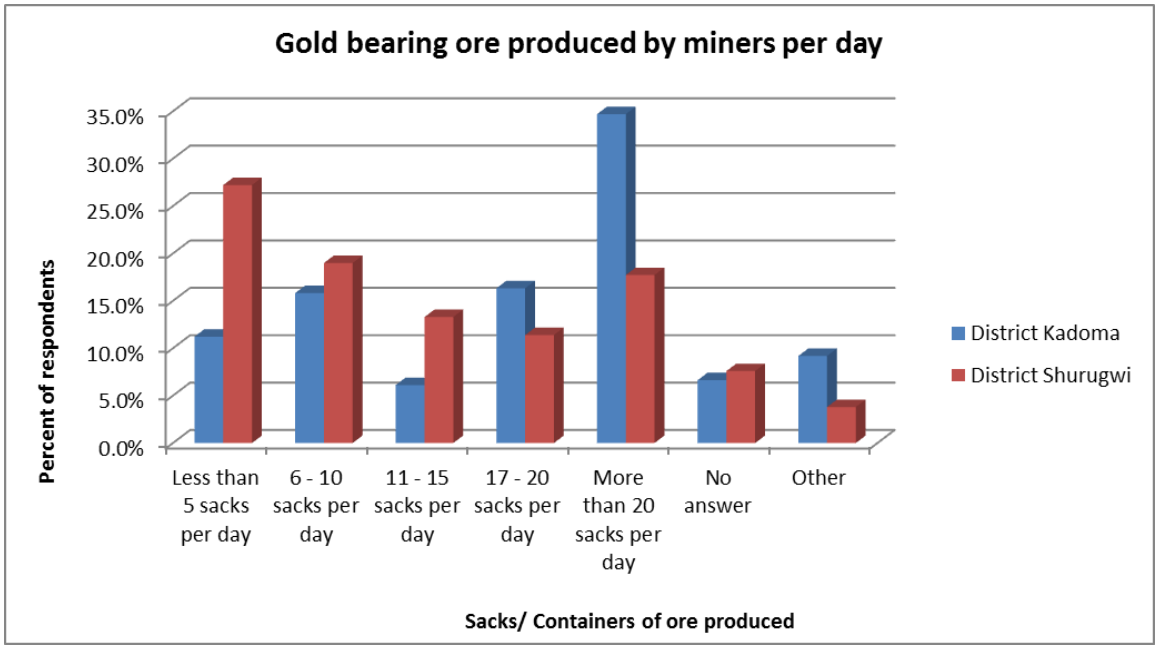


Figure 16: Bar graph of gold bearing ore produced by miners per day

Gold Processing and Trading

The map below shows the stakeholders who were identified to be engaged at different stages of gold processing / milling:

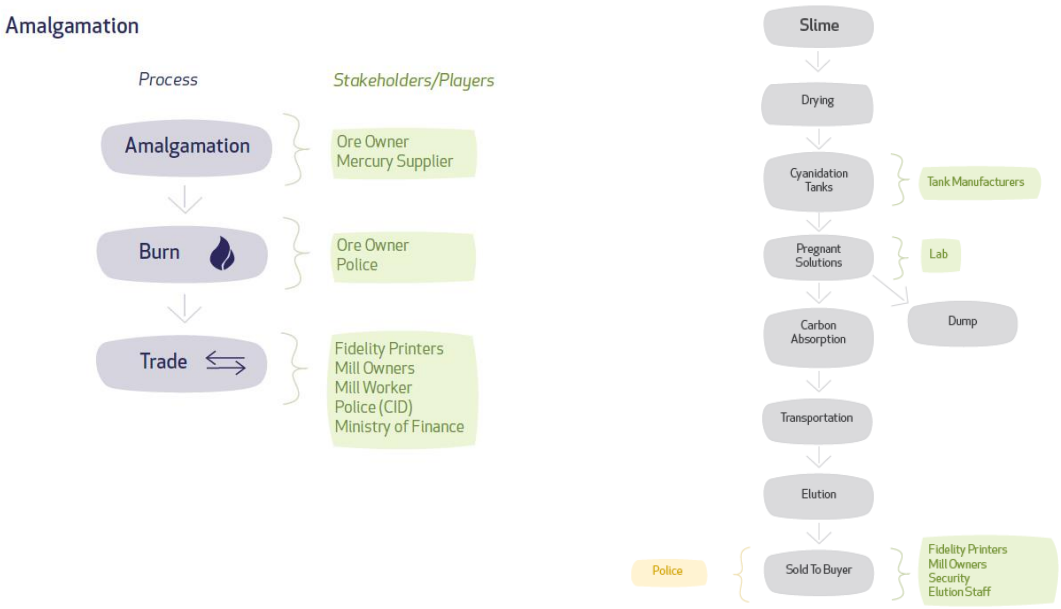


Figure 17: Milling flow diagram and stakeholders involved in milling

Milling

On the legal status of milling sites; the results from millers' questionnaire showed that 87% of the milling sites were registered while 13% chose not to answer this question. With regard to valid licenses for operations, 45% of millers reported having valid licenses while 55% chose not to respond to the question. As revealed in two different focus group discussions with millers, the cost of annual licencing (USD8,000) is deemed as too high by millers and less than half of them comply. In order to ensure compliance across the entire gold mining and trading sector it is imperative that the costs of compliance are rationalized.

Figure 18: A stamp mill.

Work Schedule

About 89% of the millers reported milling throughout the year while 9% only mill during the dry season. As shown before in the report gold output falls drastically during the rainy season which prompts nearly a tenth of the millers to stop milling. This fall in production is caused by flooding of shafts by rain and the exodus of seasonal miners who leave to engage in farming.

To understand gold production, the millers were asked about the type of gold processing carried out at their milling sites. The results show that almost 90% of gold processing is milling. The figure below shows the proportion of the millers by the type of gold processing they conduct in their milling sites.

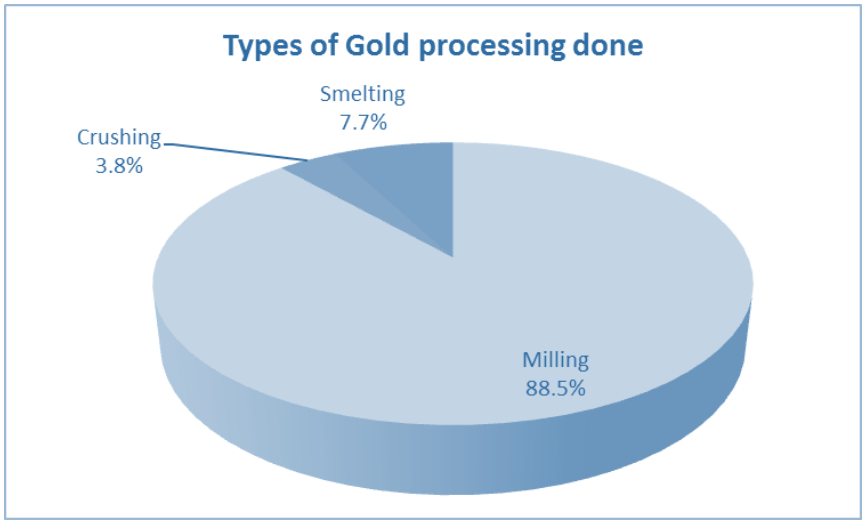


Figure 19: Types of gold processing done

The respondents from FGDs also talked mostly about gold milling where normally the process involves recovering free gold using separators and that free gold is smelted and sent direct to FPR. Another process (secondary to milling) is vat leaching where through the use carbon, gold is dissolved using cyanide and caustic soda and then absorbed by carbon. The gold is then eluted from carbon by using pressure and heat from the boilers then eluted gold is smelted and sent to FPRFPR.

A miller in Kwekwe informed the survey team that another method used to recover gold is processing the rubble. This is reported to be fresh ore that is available on the surface, but it's generally low grade ore leftover from previous sorting). Another method is processing the tailings where it was reported that "*there is also an industry of what has been left over by the previous mine e.g. what they call German shafts. If you find a shaft that was previously mined by the Germans you are most likely to find something that was left behin*d"- Noted a miller from Kwekwe.

Estimates of ASM gold production

a) Capacity of Containers used in ASM

In order to quantify gold production, miners were first asked to provide information on the number of sacks/ containers of gold bearing ore they extract from a shaft in a day as well as the capacity of these sacks/containers. This data was used to determine the quantity of gold bearing ore extracted from a shaft in a day. The majority of miners (72%) reported using sacks with a capacity of less than 50kg while a fifth of miner reported using sacks of 50 – 100 kg capacity. Only 5% of miners reported using sacks/containers with a capacity of more than 500 kg.

b) Quantity of Gold Bearing Ore Produced

Just under a fifth of the miners (18%) produce less than 5 sacks a day while a similar proportion (17%) produces 6 – 10 sacks of gold ore per day. Just under a tenth (9. %)) of miners produce 11 – 15 sacks of gold ore while 14% produce 17 -20 sacks of ore. Over a quarter of the miners (27%) reported that they produce more than 20 sacks of ore per day. Considering the capacities of the

sacks reported above, this indicates that miners in Kadoma and Shurugwi on average produce between 400 kg and one tonne of gold bearing ore per single shaft in a day.

a) **Frequency of Taking Ore for Milling**

To further understand the average quantity of gold produced by ASM per month, the survey collected data on average quantity of gold bearing ore that is taken by miners to the mill per single visit as well as an average number of visits that a miner makes to the mill in a month for the purpose of milling gold ore. The results show that 53% of miners are taking more than 5 tonnes of ore per visit to the miller while are taking between 3 – 5 tonnes of ore. 38% of miners visit mill sites for gold processing twice a month while 32% visit once a month. The table below provides details by district, millers/ miner responses.

Quantities of ore taken to milling per month		District				
		Kadoma		Shurugwi		
		Miners	Millers	Miners	Millers	Total
Ore transported to the mill per visit	Less than 1 tonne	4 (2.3)	0 (0.0)	16 (11.4)	2 (15.4)	22 (6.2)
	1 - 2 tonnes	18 (10.5)	1 (3.0)	14 (10.0)	2 (15.4)	35 (9.8)
	3 - 5 tonnes	45 (26.3)	10 (30.3)	47 (33.6)	3 (23.1)	105 (29.4)
	More than 5 tonnes	104 (60.8)	16 (48.5)	63 (45.0)	6 (46.2)	189 (52.9)
	No answer		6 (18.2)		0 (0.0)	6 (1.7)
Sub - Total		**171 (100)**	**33 (100)**	**140 (100)**	**13 (100)**	**357 (100)**
Frequency of transport of ore to miller per month	Once	55 (32.2)	3 (9.1)	53 (37.9)	3 (23.1)	114 (31.9)
	Twice	65 (38.0)	12 (36.4)	53 (37.9)	5 (38.5)	135 (37.8)
	Three times	21 (12.3)	9 (27.3)	15 (10.7)	2 (15.4)	47 (13.2)
	Four times	10 (5.8)	4 (12.1)	9 (6.4)	0 (0.0)	23 (6.4)
	More than 4 times	20 (11.7)	5 (15.2)	10 (7.1)	3 (23.1)	38 (10.6)
Sub - Total		**171 (100)**	**33 (100)**	**140 (100)**	**13 (100)**	**357 (100)**

Table 8: Quantities of ore taken to milling per month

b) **Quantity of Gold Recovered from the Ore**

Miners were asked how much gold they obtain on average from a tonne of gold bearing ore. 80% of respondents reported that they recover below 30g of gold per tonne of gold ore while a tenth of respondents chose not to respond to this question. [180]The Gold Mercury Project in Zimbabwe in 2003 reported 5-15g per tonne.

c) Quality of Gold Recovered from the Ore

Miners and millers were asked about the quality of gold that is produced. 43% reported that the gold is 76 - 90% purity, 21% reported 91 -95% purity. A quarter of the respondents chose not to answer this question. The figure 17s below provide a summary of the quantity of gold produced

[180] *According to the World Gold Council (WGC), larger and better quality underground LSM mines contain around 8 to 10g/t, with marginal underground mines have averages of around 4 to 6g/t. Open pit LSM mines usually have lower grades from 1g/t to 4g/t, but can be highly valuable despite the lower average grade.*

http://goldinvestingnews.com/world-class-gold-deposits

per 1 tonne of gold ore as well as quality of gold produced as measured by percentage of pure gold.

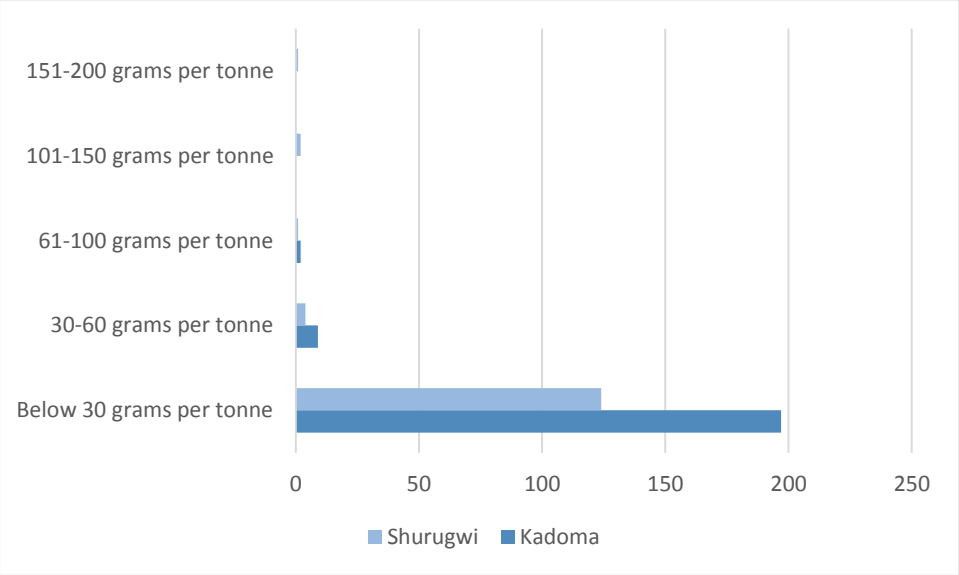


Figure 20: Quantity of gold produced per tonne of ore

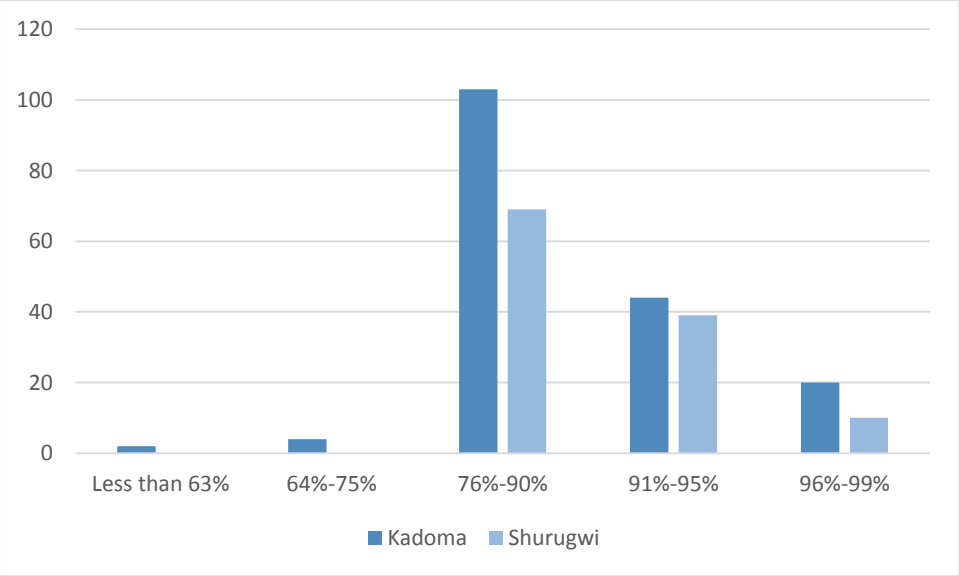


Figure 21: Quality of gold produced

From the FGDs, production was reported to vary depending on the artisanal miner. It was reported that some miners might mill once or twice a month, usually a load of 10 to 20 tonnes per each mill visit. A tribute holder reported that the highest yield ever produced depending on the reef is about 100g per 7 tonnes. ZASMC, on the other hand, reported an average yield of 20g to 50g per month.

The MMMD also felt that grades of gold are falling and noted that *"there used to be 100g per load but it looks like on average these days they hardly ever get to that level."*

FPR reports an average monthly collection of 130 kg of gold countrywide. "*What we see as FPR from January-April is 130 kg a month countrywide. There has been a government program to shake people a bit*[181]*. Out of that program, we have seen up to 350kg a month. Maybe there is still more. It's difficult to quantify what is on black market, my own estimation judging from what I have seen around, I think should be +/-+/- 600kg a month. I would rather come nearer to 500kg a month*." A miller reported production averaging 15g per tonne particularly for those who are processing the rubble collected on the surface. In terms of the quality/ grade of gold produced, it was reported by FPR that the quality varies from 85-98/99%[182] .

Membership of Millers Associations

The reason most millers (60%) are not members of associations is that there are no millers' associations in their vicinity. About 17% said it is too expensive to be a member of an association while 23% had other reasons including not seeing any added value to membership. As reported by one of the millers, "*they milk money and they do nothing*."

Gold Trading

Most miners and gold traders measure the quality of gold by specific density testing and quite a few perform acid tests and fire assays. A tenth claim to measure quality by simply observing the gold. It was interesting to note that almost half of the miners were unaware of the FPR price for gold while only 35% were unaware of the informal price for gold suggesting that miners are engaging more with the informal traders than the formal trading system. However the 65 % of miners stated that they sold their gold on the formal market (to FPR and millers) while 35% admitted to selling on the informal market (traders, claim owners and sponsors). It can thus be estimated that between 35% and 50% of miners sell their gold on the formal market (which translates to the 130kg of gold FPR is receiving a month). The estimate of gold making it to the informal sector is thus between 130kg and 240kg of gold per month.

Other stakeholders had varying opinions on the proportion of gold that ends up in the grey market as compared to the gold that makes it to the formal market. At one end of the spectrum, a sponsor when speaking about the proportion of gold going to FPR as compared to the grey market, said "*in terms of small scale miners, and considering human tendencies, I would say 10% goes to the government and 90% goes out of the country*." A miller, on the other hand, had a different opinion, saying "*I will say up to about three months ago, Fidelity was getting half the gold but of late I think they are now getting 90% of the gold. Of late the price of the black market seems to be the same as that of Fidelity, or lower and the black market players seem to be getting fewer*."

Gold flow within Zimbabwe was reported to be composed of a complicated network of many players. Some of this gold ends up in the formal market via FPR while other material ends up in the informal (grey market).

[181] *The JOC intervention*

[182] *The highest purity of gold is 99.999%. Gold cannot be 100% pure.*

Mineral Flow Diagram

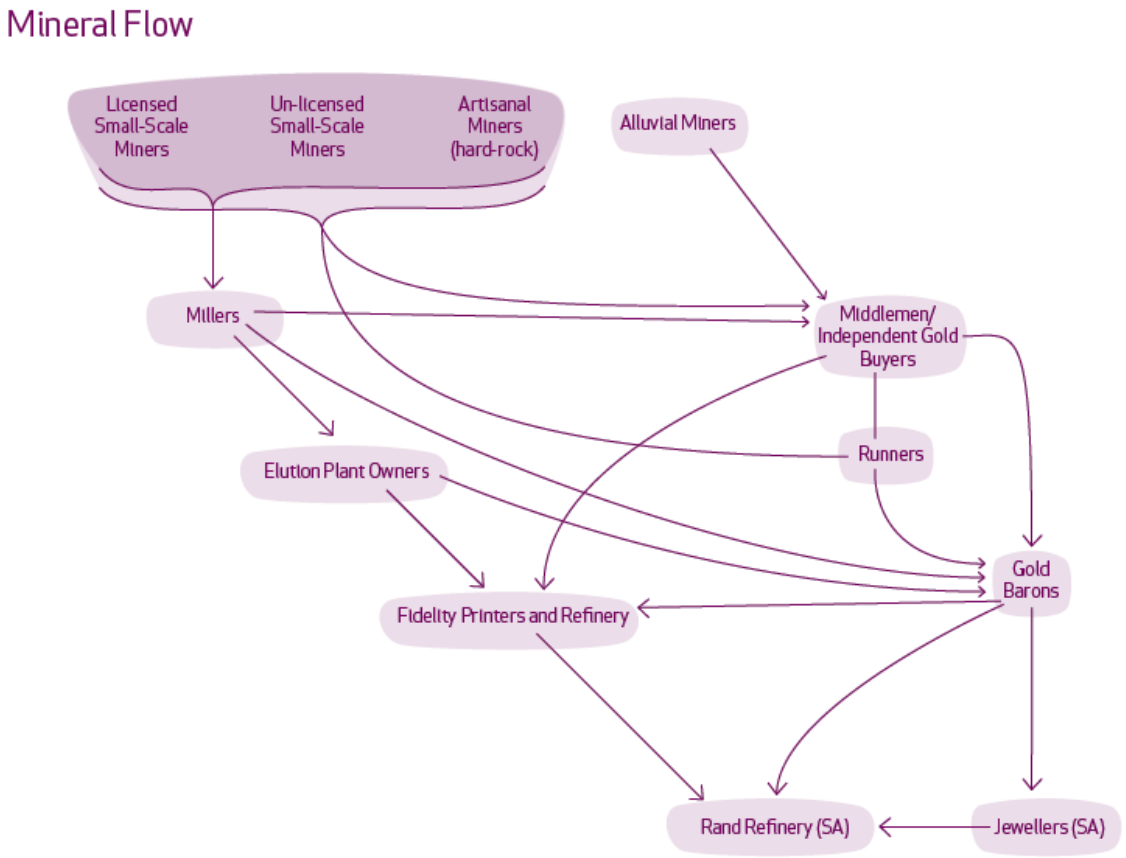


Figure 22: Mineral Flow Diagram

The 'gold barons' are the major buyers of gold outside the formal market and they operate from the large towns, mainly Harare. They employ runners who buy gold for them while also buying gold from independent, informal traders. In terms of populations, there seems to be not more than five gold barons in the country with three of them featuring repeatedly in key informant interviews. One key informant estimates that there are as many as 15 runners and middlemen operating in the town of Chegutu with a population of around 50,000[183] people.

Runners are quasi-employed agents. One runner revealed that he receives around USD10,000 to buy gold and, on a good day, he can buy as much as 200g of gold, and 4 to 5 kg in a good month. He also revealed that the top gold baron has 'thousands' of runners around the country. The gold baron covers the transportation costs while the runner receives USD0.50 per gram of gold. The runner revealed that he was buying gold at USD35.80 whereas FPR was buying at USD36. However due to taxes and charges, the FPR price would effectively be USD32.75. On this day the world price of gold was USD38.26 per gram. The informal sector was buying gold at 6.4% less than world price while FPR was buying at 14.4% less than world price. However the world price is set for pure gold (99.999%) thus 95% gold was globally priced at USD36.38. The runner also revealed that millers used to be a major seller to the informal market but this has ceased since the deployment of JORC officers to mining and milling sites in July 2014.

In interviews, miners commented on how profits are shared among stakeholders in gold production. Firstly they reaffirmed that claim owners get as much as 50% of gold and they felt that this is unfair. "*We are not comfortable with paying 50% to the claim owner. At times we get gold ore from as deep as 70m then take a 5-tonne load to the mill and from the little we get we can't even buy protective clothing for ourselves. We just accompany the mine owner or sponsor to the mill*", one miner complained during FGD. The unfairness of the sharing of the gains was also communicated by gold traders where one informal gold trader from Kadoma reiterated "*It's unfair for the miners, The guys who go underground get less yet they stay in the bush and live in hard conditions as compared to the mine owner staying at home and doing nothing; the miners get the lesser stake."* The same issue was repeated by women miners in Kadoma who felt that it was unfair that they had to undertake such tiring and hard work when, in the end, the mine owner gets more than the miners.

A miller noted that normally millers who sponsor mining put a condition that miners have to come to their mill for processing their ore. As there is residual gold left in the waste material after milling, the miller takes this waste as a means to recover the money he uses to sponsor.

Another issue noted in terms of gold flow is the question of where the artisanal miners get the money to finance mining activities. There are few formal sources of finance connected to the formal market therefore miners access informal finance which usually comes with conditions attached that have no connection to, or consideration of, FPR. In essence, the miners felt that FPR is tasked to collect gold which they never produced and thus it is inevitable that significant proportions of the gold flows escape the formal channels. It is important that the mandate of FPR and the reason for deductions made are clearly spelt out as part of the project's awareness raising.

The survey collected data on gold trade from artisanal and small scale miners and millers including information on recent sales of gold, quantities and quality of gold sold including ways in which miners/millers estimate the grade of gold and location of the sale. Other information collected was on price of gold for the formal buyer, FPR, as compared to the informal market.

[183] *2004 estimate*

This line of enquiry started with asking miners and millers whether they had made a recent sale of gold. For the purpose of this survey, recent was defined as a sale made within the last three months preceding the survey. The results show that 100% of millers and informal gold traders interviewed had made a sale of gold. Moreover around 73% of miners and mine owners also sold gold in the last 3 months preceding the survey. Other groups of respondents who reported selling gold were mine operators, team leaders, suppliers of goods and services and transporters.

In terms of the quality of gold sold, the results for gold sales show that majority of respondents made gold sales that are in small quantities and quality i.e. less than 50% in quality and less than 10g in weight. Gold with higher quality was sold in large quantities albeit by smaller percentage of respondents. The chart below provides a summary of gold sales by quality and quantity.

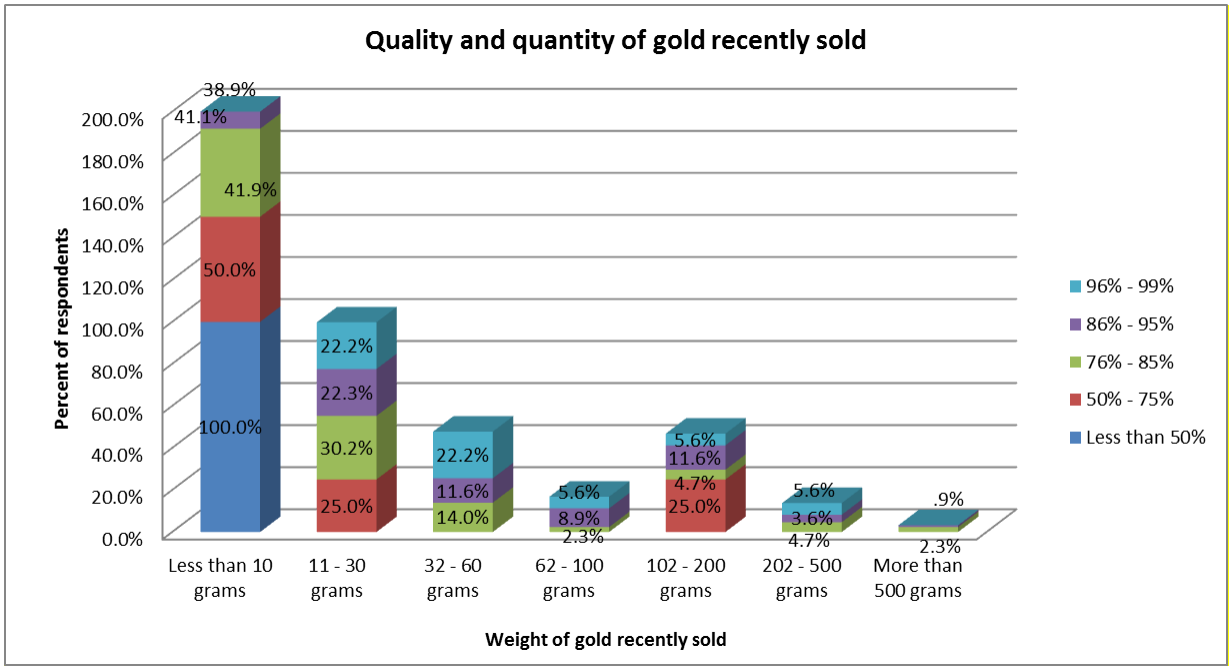


Figure 23: Quality and quantity of gold recently sold

Estimation of the quality of gold sold was mainly done by density test (specific gravity test) as reported by 61% of respondents, a tenth of respondents simply observed the gold while a further tenth do not estimate the quality of gold. Moreover 7% of respondents didn't know how to measure the quality of gold they sold. FPR revealed that most miners and millers who sell their gold to them prefer to use the density test over the more accurate fire assay which takes longer to do This reveals that in gold trading miners prioritize expediency over a potential marginal increase in revenue. In streamlining the gold buying, the project should ensure any proposed transaction systems are quickly conducted. The results on how respondents are estimating the quality of gold are presented in the figure below.

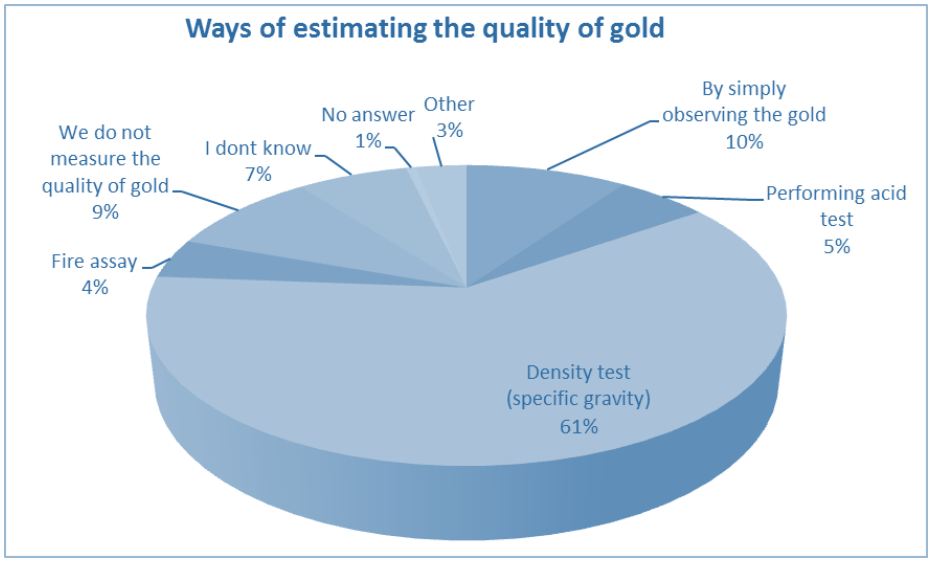


Figure 24: Ways of estimating the quality of gold

Overall the results on the location of gold transaction show that 64% of respondents who reported to have sold gold in the last 3 months preceding the survey, are selling their gold to formal channels (FPR: 28%; mill: 35%).Additionally miners reported that they sold gold to a gold trader in town (17%), at the mine (6%) and other places (13%). Out of those who reported 'other' the places where they sold gold included illegal/informal buyers (39%), visiting buyer (17%), local area/near mill/in the compound (13%), in town, to a claim owner or to a profitable buyer.

Data on gold price in formal as well as informal markets was collected and a comparison was done to understand the price differences between the two markets from the perspective of millers and miners. The results indicate no significant price differences between the two markets for gold.

An informal gold buyer reported during a key informant interview that prices of black market traders in town range from USD27-USD30 per gram of gold. On this day the world price of pure gold was USD1,231 or USD39.58 thus 85%[184] pure gold would be USD33.64. The key informant also revealed that the grey market buyers have cash at all times which makes this market favourable to miners who seem to prefer expediency to slightly higher prices. The informant also reported that miners are given the straight weight price which is based on the actual weight of the gold button and is bought at a lower price than gold that is measured using a specific density test. The informal gold trade environment is also reported to operate on barter trade system where for instance if a miner is in need of explosives, s(he) can get explosives in exchange for gold. Some barter trade are done in exchange of gold for food where miners are provided with food stuff with an agreement of payment upon producing gold.

The formal system via FPR offers a competitive price for the gold bought. FPR, however, makes 5.5% deductions out of the cash paid which means that the actual price paid is lower than the offered price. In explaining the deductions that are made on gold purchased. The 5.5% discount is broken down as follows:

[184] *The weighted average grade of gold reported by respondents*

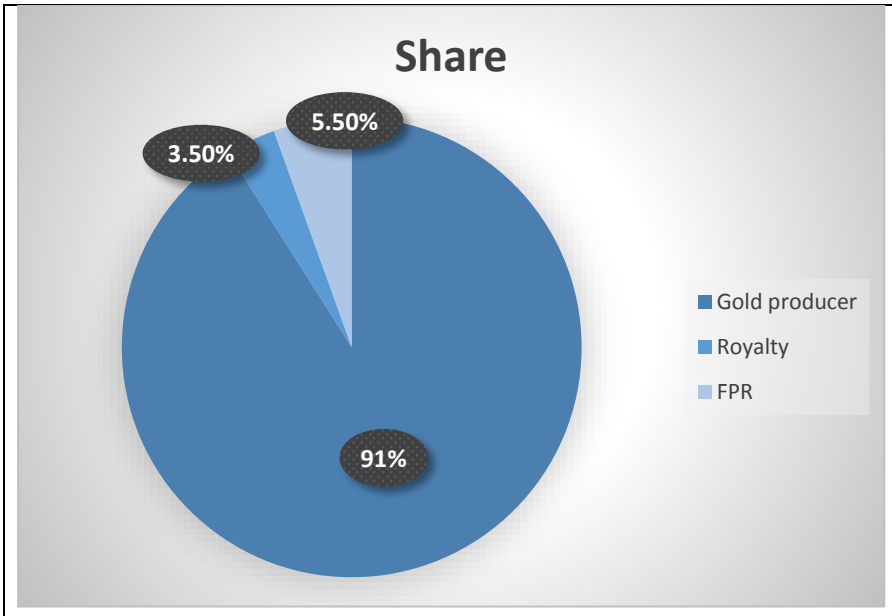
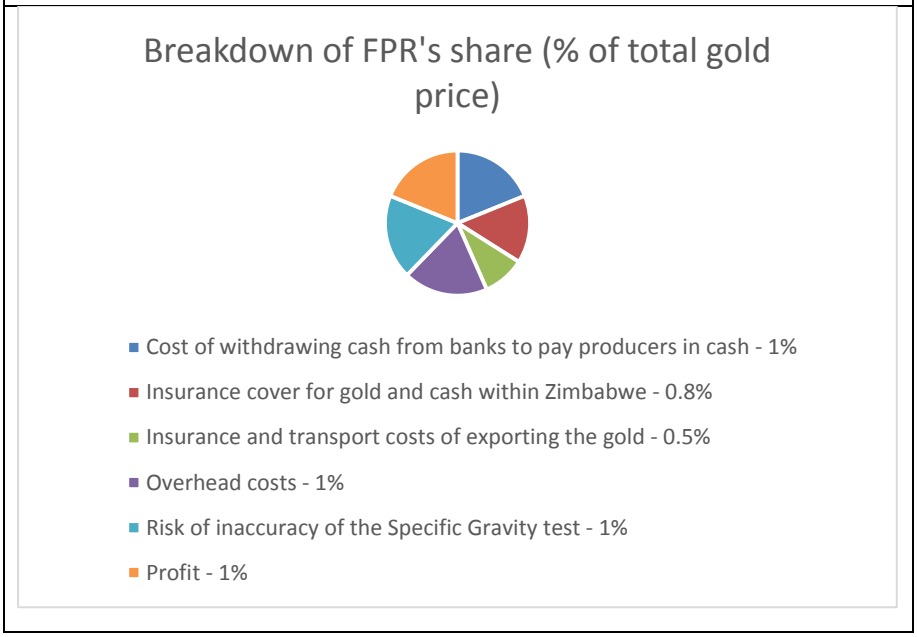


Figure 25: Share of the revenue of every gold produced



Illegal trade

Multiple informants suggested that South Africa is a key destination for Zimbabwe's gold. A senior official at FPR explained that gold is bought by a Recovery Works Plant under the guise of being scrap metal. The informal traders then obtain a 14% tax rebate from that country's tax revenue authority. This is how the informal market manages to offer better prices than the formal market. One miller's explanation of the mechanics of the informal market corroborated with these sentiments as the miller noted that "*I read a documentary that says in South Africa, SARS gives a rebate of 15% and they smelt their gold and say we have made jewellery.*"

It was reported by multiple respondents during key informant interviews that usually the sponsors sell their gold to the grey or informal market because it offers better prices and "*Most of the sponsors do not sell to Fidelity; they have their own buyers who are either in South Africa or Harare*."

It was further emphasized that illegal trading is happening in towns as the risk of robbery is high in the bush, see figure 23.

An informal gold buyer explained that "*Normally I don't take my gold to Fidelity. It's only good for people who have claims, not us. Because normally I am being sponsored by someone, he comes and gives me USD10,000*[185] *and then says buy gold from me. I get on average 50 cents for each gram as profit*."

Both MMMD and FPR agree that the informal market presents major challenges. "*The informal market will always be there and miners will use it so long as informal market prices are slightly above Fidelity*." FPR stresses that illegal buyers' prices are very similar to FPR but the grey market capitalizes on the fact that they don't pay taxes. A sponsor in Kadoma also reiterated the same point "*The industry prefers the informal market for one reason, the pricing. There is less going to government and more going out because of pricing and tax*." Added to this, the fact that illegal miners do exist and FPR will only buy gold from formal/registered miners, the illegal market will always have a business from illegal miners.

Factor	Description
Time	This has been shown to be the prime factor – miners want to sell their gold as quickly as possible.
Price	Miners want a higher price for their gold
Location	Miners/millers prefer to travel the least distance in order to sell their gold. However some locations such as Harare are appealing in that a miner/miller would find cheaper inputs there and thus the travelling will serve two purposes: selling gold and buying mining inputs. This is balanced against the opportunity cost of being away from the mine for sales purposes and thus losing productive time
Legality	Illegal miners/millers have no access to the formal market and have no choice but to sell to the informal market
Relationship with a pre-financing Sponsor	Miners often get working capital from third parties who often have the first right of refusal of buying the material
Liquidity	The less money a miner has on them the more they need to sell they gold quickly
Security	Miners want to sell their gold in a scenario where they feel secure with no threats of having their gold or money stolen from them

[185] *On the day of the interview USD10,000 would buy 351 g of gold.*

Barter	In a few instances miners prefer to exchange gold for a service/good

Figure 26: Factors that Miners / Millers consider in gold trading

Taxation and payments

The baseline survey also collected information to understand the tax and deductions that are made after the sales of gold in both the formal and informal markets. Around half (52%) the respondents revealed that deductions are made when gold is sold while the other half (48%) stated that no deductions are made. Of the deductions made, a fifth of respondents stated that these were these were milling and transport costs while 12% were charged food and operational costs. A tenth of the respondents stated that the deductions were royalty payments. The royalty was stated to be in either monetary form of between 50 – 70 USD per transaction, or in kind as gold form i.e. claim owner/ sponsor/buyer deductions of between 1.7 g – 15 g while one respondent mentioned two wheel burrows of gold-bearing ore.

It should be noted that millers have the responsibility to collect the royalty, presumptive tax and FPR charges on behalf of FPR however some millers do not remit these to FPR or do not collect so as to incentivize miners to come to their mills.

The chart below provides summary of deductions made for gold transactions.

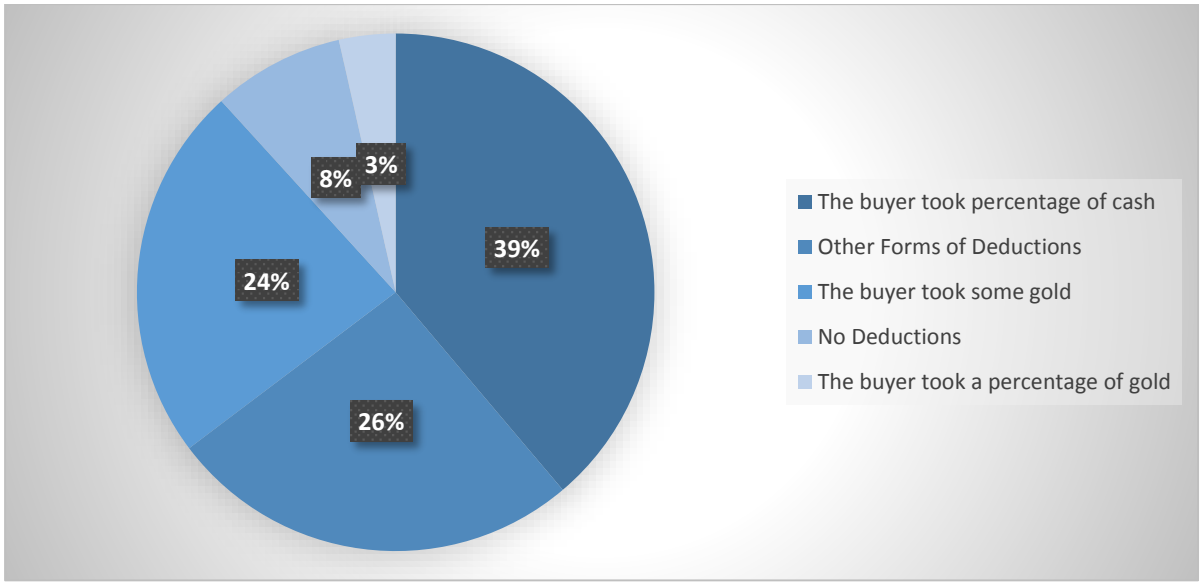


Figure 27: Deductions made on the earnings from the gold sale

The respondents revealed that half the deductions are in the form of tax, with 46% citing royalty and 5% presumptive tax. A quarter of the deductions were made for the purpose of getting protection from the buyer. Claim owners were reported as being responsible for 11% of the reported deductions which they collect as a rent for mining on their claims. The chart below shows the main reasons for deductions made after gold sales:

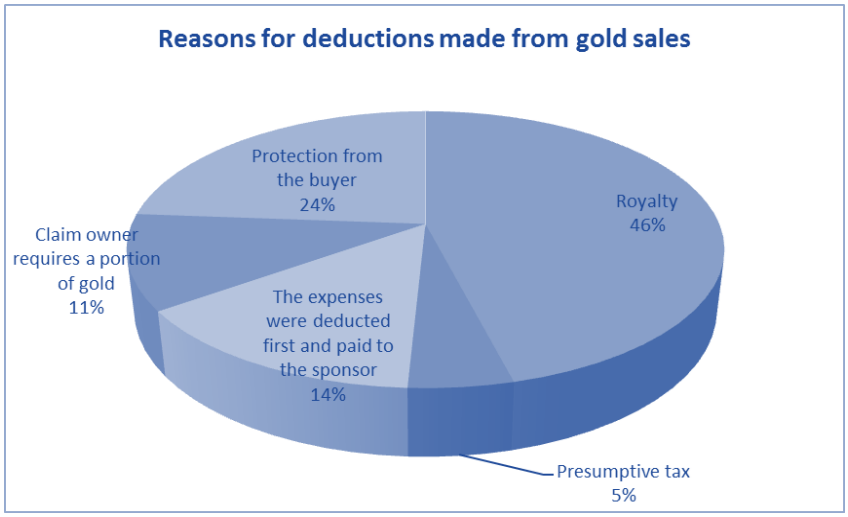


Figure 28: Reasons for deductions made from gold sales

Gender Issues in ASM

While the report has made an attempt to address some gender issues throughout the previous sections, this is a section that will present specific findings on respondents' perspectives on women's participation in mining, the proportion of women taking part in gold mining and trading, as well as perspectives on women in leadership of mining associations. The section will also present information on gender-based decision making powers in the household for income expenditure.

The ASM sector creates important opportunities for impoverished women to find non-farm employment. Women frequently use ASM as a supplementary income source, often seasonally, and their presence around the mines may be less visible, so they may be excluded from estimates and the number of women in the mines may be even higher.

Literature indicates that women may constitute up to half the ASM workforce in Africa[186] though the proportion of women in the ASM workforce varies from country to country as shown in the table below:

Country	Number of women	Proportion of women / %
Burkina Faso	90,000	45
Ghana	112,500	45
Guinea	70,000	70
Kenya	80,000	80
Malawi	6,000	10
Mali	200,000	50
Mozambique	60,000	30

[186] *(Hinton, Veiga, & Beinhoff, 2003)*

South Africa	500	5
Tanzania	375,000	25
Uganda	90,000	60
Zambia	18,000	30
Zimbabwe	250,000	50

Table 9: Proportion of Women in the ASM Workforce by country (Source: Hayes, 2008)

The baseline survey discovered that in this study group, women constituted 11% of miners in target areas. In comparison, women constituted 53% of the control group. Thus our study showed a proportion of female miners significantly below the above-stated estimate of 50% of miners. The baseline survey also revealed that a third of respondents didn't know the proportion of women participating in ASM mining while over half said that only a few women participate in ASM.

Roles for women in ASM

Women carry out a full range of activities within ASM, at mining sites, in mineral trade and in the provision of support services. In the mining sites, women dig, crush and pound rocks, wash and sort material, carry out processing such as amalgamation of gold, and transport materials. Women also provide services to mining areas including catering, sales of goods, and sex work.[187] In the Cocoase Camp at Tarkwa in Ghana, risks associated with underground mining were given as justification for women carrying gold ore and water and pounding rocks rather than digging.[188]

The baseline survey revealed that women miners predominantly engage in actual mining activities (83%), panning or washing of ore (7%) and gold trading (5%). The baseline study found that there is some degree of division of labour as few women engage in blasting, hoisting and drilling.

The baseline survey revealed that there is a clear difference in the opinions of men and women on the issue of women in mining. 63% of women in Kadoma and 47% of women in Shurugwi reported that women's role in mining is essential as compared to 25% and 23% of men in those areas respectively. On the other hand, 47% of men in Kadoma and 41% of men in Shurugwi felt that women's role in mining is not important versus 14% and 22% of women in those areas. It is important to tailor the project in a way that is sensitive to these perceptions thus women leaders in the community can be engaged to in any gender-oriented interventions.

While in some cases women occupy powerful positions in ASM such as millers, mine owners and gold traders, the majority of women occupy a distinctly marginal role in the management of small-scale mining operations worldwide. They are rarely identified as miners in their own right and only sporadically attain the same decision making positions as their male counterparts - positions such as concession owners, mine operators, dealers and buying agents, and equipment owners.[189]

In terms of attitudes towards women in leadership positions in ASM associations and other bodies, respondents were asked whether they are comfortable with women playing leadership roles. The

[187] *(Hayes, 2008)*

[188] *(Akabzaa and Darimani, 2001)*

[189] *(Susapu & Crispin, 2001)*

results showed that women felt more comfortable about women's leadership role than men were. The baseline data shows that 83% of women in Kadoma and 90% in Shurugwi are comfortable with other women taking leadership roles. This is a contrast to what men feel, as 61% of men in Kadoma and 59% in Shurugwi who reported comfort with women in leadership roles. All supervisors and blasters that took part in the survey are men and the majority of blasters (94%) are men pointing to the fact that women are less skilled than men and thus less likely to land leadership positions.

For those respondents who reported being uncomfortable about women in leadership, the survey sought to understand their reasons. The data show that 42% of respondents said that women are not culturally favoured, a third felt that women don't know the mining sector well enough, and 18% of respondents felt that women are preoccupied with household chores.

No women were taking part on the ore processing, neither in amalgamation or the cyanidation process. This is different from artisanal mining activities in Burkina Faso and Mali where a study initiated by the World Bank found that women who constitute approximately 45% of the ASM workforce conduct 90% of the mineral processing activities.

Gender discrimination in ASM

Women in ASM suffer different forms of discrimination. Economically, they are often required to surrender high value products. USAID reported that in Siguiri in Guinea, men typically take control of 80% of the profits generated by the women who work alongside them doing the same tasks.[190] WomenWomen often do not receive equal financial reward as men.[191] One reason for low payment to women could be seen in the ''unskilled'' nature of the work they perform.

There is a relationship between levels of technology use or mechanisation and the numbers of women employed in ASM. Typically, women work in less mechanised ASM operations. As the mechanisation increases, the number of women involved reduces.[192] This may be due to assumptions that women do not have the technical skills or cultural 'suitability' to operate machinery or may be due to the formalising of work structures which focus on recruitment of men. It may also be that as income generation opportunities improve, men dominate the new and better paid options while women are relegated to the lower income activities. Another contributing factor may be that women have greater difficulties in accessing capital to purchase equipment.[193] In Tanzania, women have to have their husband's permission before applying for a loan.[194]

Culturally, women are discriminated against when cultural barriers that hinder women's involvement in artisanal mining exist. For example in N'tulo, Mozambique, Niassa women are not allowed to work at the mine site because they are believed to attract bad spirits so they are only allowed to sell food and beer. In Manica, Mozambique women are not allowed to dig trenches, but they can transport the ore to the processing sites and wash it.[195] Financially, women are also discriminated against - in a study conducted by the USAID in 2000 in Siguiri, Guinea, women and men work side by side washing gold

190 *(USAID, 2000)*

191 *(Drechsler, 2001)*

192 *(Lahri-Dutt, 2008)*

193 *(Hayes, 2008)*

194 *(Lahiri Dutt, 2004)*

195

from the lateritic soil. For every five calabashes (a large carrying container) of ore that women wash, male intermediaries (buyers) receive the profits from four: women retain one.

Risks for women in ASM

The Zimbabwean Government, through the Ministry of Women Affairs, Gender and Community Development (MoWAGCD), set up a Women in Mining programme with the aim of promoting participation of women in the total mining value chain. The Ministry facilitated the establishment of Women in Mining Apex Board which has structures from National to District levels. This board is currently working with the MoWAGCD and the MMMD to resuscitate women's service centres. Currently seven centres are operational.[196] The MoWAGCD has, to date, held four mining capacity building workshops to facilitate the transformation of women miners' businesses from informal to formal where 260 women were trained and subsequently 1,005 women were mobilized to venture into small-scale mining.

In addition there exists the Zimbabwe Women Rural Development Trust (ZWRDT), an NGO with more than 500 members (over 100 of whom are miners) which operates mainly in the Midlands and Matabeleland provinces. The NGO helps women in their participation in small-scale mining. The baseline survey found that women are more likely to be members of a miner's association (19%) than men (11%). 12% of women identified gender discrimination as a reason why they are not members. There is an almost equivalent proportion of women (3%) and men (4%) who after processing gold, get their share in gold and sell it themselves.

[196] *Ministry of Women Affairs, Gender and Community Development Statement, 2015*

Figure 29: Female miner cooking outside her tent

Women and Informality

Women are more likely to operate on unregistered land/informal operations (35%) than men (19%). Those who work on registered claims are more likely to work on claims without a valid licence (28%) than men (20%). 13% of men receive a monthly salary as compared to only 7% of women. This could be due to one or more of these factors:

- They are less skilled than men as outlined above. 86% of women are unskilled as compared to 68% of men;
- Women are more likely to work less hours per day at the mine than men – as shown by the fact that 34% of women work less than 7 hours per day at the mine while only 8% of men work less than 7 hours per day at the mine. This could be because most women play two roles: mining and their household duties. The comparison of working hours that men and women commit to mining are shown in the chart below:

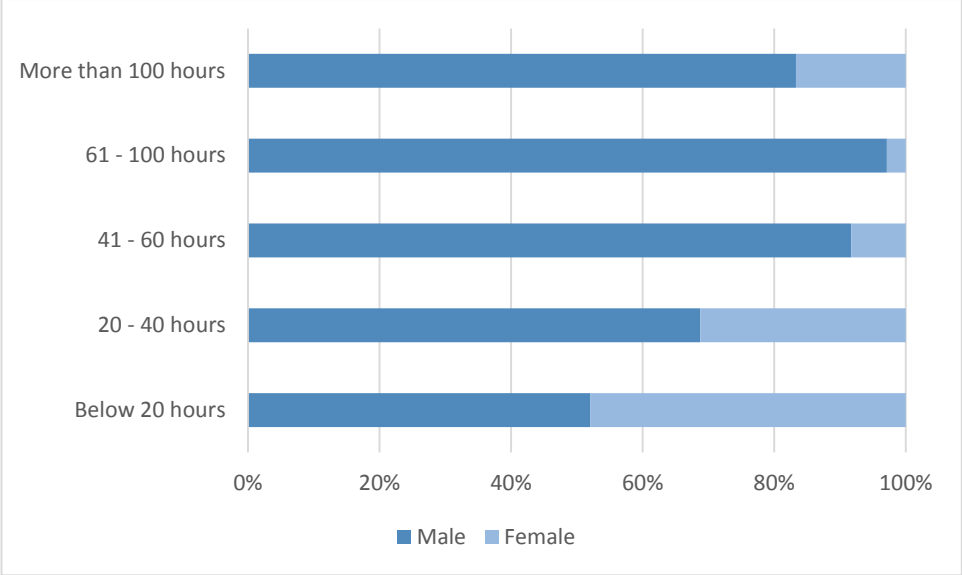


Figure 30: Comparison of working hours per week between men and women miners

- Women are less likely to work in teams - only 55% work in teams as compared to 85% of men. However when they do work in teams women tend to work in larger teams than men (regardless of the gender of the other team members); and
- Women are less likely to work all year round than men – only 52% of women do as compared to 69% of men. 26% of female miners only engage in mining during the dry season as compared to 27% of men.

Women spend less time at one mining site than men as shown by the fact that less women (6%) than men (9%) have spent over 10 years at one site while more women (41%) than men (36%) have spent less than 6 months on one site. This could reflect a trend where women spend less time overall in mining than men.

This assertion is strongly supported by the fact that while women have less commitment (in years) to on mining site, they have also worked on fewer mining sites over their lifetimes. Only 17% are working on their first mining site while 45% of women are. Additionally, only 4% of women have worked on more than 10 mining sites as compared to 11% of men. Only 55% of women plan to stay in mining for as long as possible, as compared to 66%.

Women FGDs revealed that most women borrow the tools and equipment they use in mining. "*We borrow the tools that we use from other people and during the process some of the tools get broken and we have to buy new tools or repair the tools but we usually do gravel mining and we do not need equipment such as compressors and jack-hammers*" one FGD participant stated.

4.2.2. Children in mining

Gold mining is extremely dangerous work for children. Yet still today, tens of thousands are found in the small-scale gold mines of Africa, Asia and South America. Children who engage in ASM come from various family situations and age ranges and are often first introduced to the mines by accompanying a parent to work. The children's labour might start out as a side activity but grows in

significance with their age. Over time, the family depends on the supplemental income to cover the cost of household or discretionary items or school (if a school is nearby).[197]

Under international and domestic law, the Zimbabwean government is obligated to protect children from violations of their rights, including the worst forms of child labour such as mining and commercial sexual exploitation. At an international level Zimbabwe is bound by the ILO Convention No. 182 on the Worst Forms of Child Labour, The African Charter on the Rights and Welfare of the Child, the Children's Act, the Labour Act and the Domestic Violence Act. [198]

Children's roles in Mining

Children's roles in mining vary considerably by location, by mineral, by gender and by age. For example, in tin mines in the DRC, mining tasks for younger children are typically less rigorous than those for adults and they often engage in lighter surface digging or in the transport, sorting, or washing of minerals and the selling of goods to fellow workers, though as they enter adolescence they progressively take on adult roles.[199] In Tanzania, children are involved in every phase of the mining process in small-scale gold mines. They dig and drill in deep, unstable pits during shifts of up to 24 hours. They transport heavy bags of waste material and gold ore and are involved in manually crushing the ore into powder and the subsequent amalgamation.[200] Child miners work long hours. Nearly 50%of survey respondents in a study in the DRC reported that children over the age of seven work eight or more hours a day, and 78%of respondents affirmed that children between 15 and 17 work more than eight hours a day.[201]

InIn this study, it was found that only 5.3% of miners get assistance in their mining activities from their children. Children between the ages of 15 and 18 years work on average 2.38 days per week and 4.13 hours per day while children between the ages of 10 and 14 work on average 1.13 days per week and 3.13 hours per day. Children below the age of 10 years work 0.75 days per week and 0.81 hours per day. This is below the average rate of child involvement in child labour in Zimbabwe which the United Nations Children's Fund (UNICEF) estimates at 13 percent. A global child labour index for 2012, released in late 2013 by Maplecroft, an international risk analysis firm, ranked Zimbabwe among the 10 worst performers, out of 197 countries surveyed worldwide, for the frequency and severity of its reported child labour incidents.[202]

Risks for Children Miners

In addition to emotional, behavioural, and developmental risks presented by mine work, children are more susceptible to health risks and mining hazards than adults.[203] Like adults, children suffer the effects of noise and vibration, poor ventilation and lighting, exhaustion and overexertion. But children are particularly vulnerable to exposure to dust and chemicals because their systems are still

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[197] *(Hahn, Hayes, & Kacapor, 2013)*

[198] *Child Labour is defined by the International Labour Organization as work that is harmful to children's physical and mental development and interferes with their schooling.*

[199] *(Hahn, Hayes, & Kacapor, 2013)*

[200] *(Human Rights Watch, 2013)*

[201] *(Hayes, 2008)*

[202] http://maplecroft.com/about/news/child-labour-index.html

[203] *(Hayes, 2008)*

developing. The result can be serious respiratory conditions (such as silicosis), constant headaches, hearing and sight problems, joint disorders and various dermatological, muscular and orthopaedic ailments and wounds, jeopardizing both their mental and physical long-term health.

The harmful effects of mining on children include its impact on the enjoyment of their rights to health, education, and protection from violence and abuse.[204]

Figure 31: Miners' children collecting drinking water from a makeshift stream designed to channel water to the mine-site

Girls are particularly vulnerable to early sexual debut or pregnancy.[205] Girls at and around mining sites are at risk of sexual harassment, including pressure to engage in sex work. As a result, some girls can become victims of commercial sexual exploitation and risk contracting HIV and other sexually transmitted infections.[206]

Children who work in mining sometimes miss out on important educational opportunities and experiences. In some cases, mining causes children to skip classes or drop out of school. It can also impact students' time and motivation for study.[207] In mining communities in Mozambique, most of the children go to school in the morning, while in the afternoon they join their parents at the mine site thought it is also reported that children skip classes or leave school in order to work at mines.[208]

Zimbabwe has made great strides in meeting the Millennium Development Goal of universal primary education. The ZimStat Multiple Indicator Cluster Survey for 2014 shows that females between the ages of 15 and 24 have a higher literacy rate (92%) than their male counterparts (86%). The same study shows that there are more girls enrolled at primary schools in Zimbabwe than boys with the gender

[204] *(International Labour Organization, 2006)*
[205] *(Hayes, 2008)*
[206] *(Human Rights Watch, 2013)*
[207] *(Human Rights Watch, 2013)*
[208] *(Valoi, 2000)*

parity index measured at 1.01. The primary school completion rate 98% for girls and 97% for boys. There are increasingly more girls (63% of all girls of secondary school going age) in secondary schools than boys (52%) with a gender parity index of 1.17 and an annual growth of 1.15%.

As outlined in the demographics section, more non-miners (74%) have children of school-going age as compared to miners (68%). Miners' children are more likely to be in school than non-miners' children and boys are also more likely to be in school than girls. Truancy to engage in mining is low for the children of both miners and non-miners. The baseline study found that 79.4% of boys and 75% of girls of school gong age are regularly attending school.

In terms of children's education, 70% of respondents reported having school age going children. 2% chose not to respond to this question which could be an indication that they have children of school going age that are not enrolled/attending school. The data from Kadoma seem to indicate that there are more girls of school going age who are not enrolled/attending school (12% for miners and 14% for non-miners households) as compared to boys (5% for miners and 4 % for non-miners households). In Shurugwi, it appears that non-miners' children are more likely not to be enrolled/ attending school (25% of boys and 19% of girls) than miners children (17% of both boys and girls). The table below shows summary of school enrolment and attendance for girls and boys as disaggregated by mining and non- mining households.

To further look into children's school attendance, a composite indicator 'children school attendance' was developed through computing school going age children currently enrolled and attending by the frequency of attendance in a regular school week over a period of one school term. The indicator was assigned four disaggregation levels i.e.

- Regular attendance defined as registered and attending school regularly (5 school days per week);
- Moderate truancy defined as registered and attending school an average of 3 school days per week;
- High truancy is when a child is registered in school and having irregular attendance (2 school days per week); and
- Not attending school comprising of all those children that are reported as not attending school.

The table below presents data on children school attendance where for boys overall 79% are regularly attending school as compared to 75% of girls. Moreover 16% of boys are not attending school as compared to 17% of girls. The remaining percent have either high or moderate truancy.

Children school attendance		District				Total
		Kadoma		Shurugwi		
		Miners	Non- Miners	Miners	Non- Miners	
Boys school attendance	Regular attendance	99 (90.8)	40 (93.0)	56 (73.7)	87 (68.5)	282 (79.4)
	Moderate truancy	2 (1.8)	1 (2.3)	7 (9.2)	4 (3.1)	14 (3.9)
	High truancy	1 (0.9)	0 (0.0)	0 (0.0)	3 (2.4)	4 (1.1)
	Not attending school	7 (6.4)	2 (4.7)	13 (17.1)	33 (26.0)	55 (15.5)
Total		**109 (100)**	**43 (100)**	**76 (100)**	**127 (100)**	**355 (100)**
Girls school attendance	Regular attendance	95 (82.6)	33 (80.5)	60 (69.8)	88 (69.8)	276 (75.0)
	Moderate truancy	4 (3.5)	1 (2.4)	11 (12.8)	8 (6.3)	24 (6.5)
	High truancy		0 (0.0)		5 (4.0)	5 (1.4)
	Not attending school	16 (13.9)	7 (17.1)	15 (17.4)	25 (19.8)	63 (17.1)
Total		**115 (100)**	**41 (100)**	**86 (100)**	**126 (100)**	**368 (100)**

Table 10: Children school attendance

When asked if children missed school in the last 4 weeks in order to help their parents in mining/non–mining work, 92% of respondents said no, 4% said yes, 2% chose not to answer the question while 2% said they didn't have children. For those that said 'yes' to children helping in mining, they were asked how regularly this happened. 44% said rarely, 31% said the children missed school sometimes, and 25% said children missed school often as shown in the figure below.

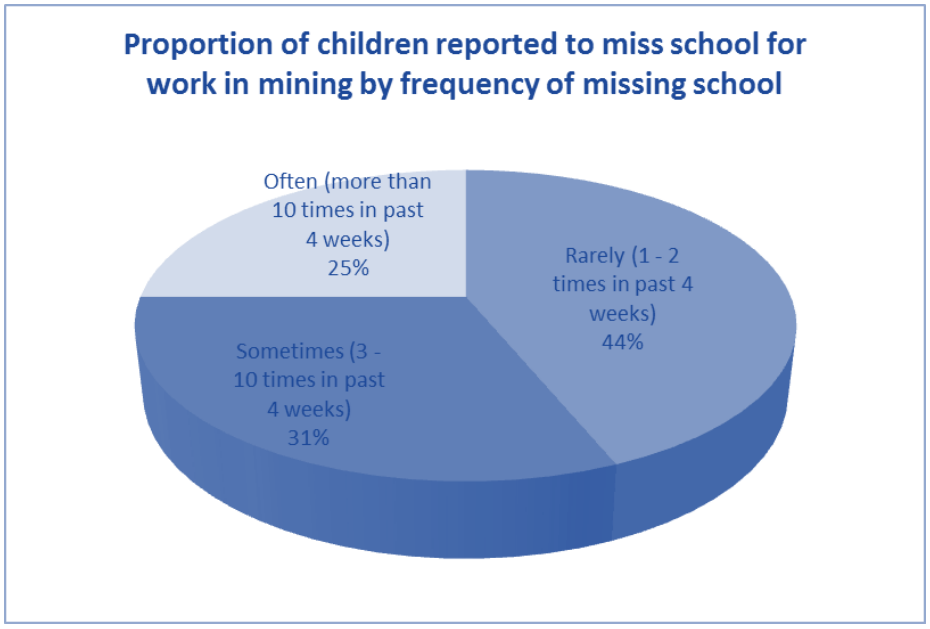

Figure 32: Proportion of children reported to miss school for work in mining

During focus group discussions in Shurugwi, women reported that generally Shurugwi receives an average to below-average rainfall which makes dependency on agriculture difficult. Parents are often unable to provide the basic necessities for their children and it is against this background that young pupils are forced to drop out of school to work as gold panners in areas where alluvial gold is accessible. Some children go panning to contribute to their family if their parents are sick or they are too old to work or engage in mining activities.

Miners reported that child labour in mining is negatively impacting children's education. Very few children in remote areas, e.g. in Chakari, are reported to finish their O-levels. Some schools like Chironde Secondary school and Nyamakare were reported to have recorded 0% pass rate at O level. A FGD with teachers revealed that pupils engage in part-time gold panning in order to contribute to their families as well as to pay for their education costs. One teacher reported that "*Children as young as 12 years are involved in illegal gold mining*." Young girls are reported to engage in providing services such as selling food and beer to male gold panners, rather than being involved directly in mining.

Miners were asked if they would want their children to be miners where the responses were highly negative. One miner reported that "*Personally I wouldn't encourage my child to be an ASM considering all the heartaches associated*." On the other hand, mining tended to be associated with lack of education where miners reported that children's involvement in mining will depend on the investment parents are making in their children's education. They said that if children are uneducated, they will have to be miners.

Children's work in mining is affecting them in many aspects of their social life. Teachers reported that "*School children who engage in gold mining end up abusing drugs thus enforcing discipline in them becomes a challenge*." They also said that children who engage in gold mining may also engage in early sexual relationships thus exposing them to STIs and HIV/AIDS and also teenage pregnancy however there is no evidence suggesting HIV prevalence is higher in ASM than other economic activities thus ASM might not be any riskier. School drop outs are reported to be on the increase as young boys are turning to gold panning. Other effects are exposure to violence and prostitution. In Shurugwi, it was reported that young girls are often victims of sexual violence or rape.

Women miners' FGD revealed that some children work with older people while others work as groups of children only and these children are usually between 13 and 14 years of age. Some of the children attend school during the day and go to their mines after school but, in the end, once they start earning money they soon end up thinking it is better to go panning than to go to school.

Women miners further explained that children start panning because they have seen other children of their age who are making money out of it. This can create peer pressure for children to also earn money of their own. Children as young as grade 5 are reported to be well conversant with gold mining and trading where they are able to tell if the ore has got gold or not, can pan alone and can negotiate with the gold buyers.

4.2.3. Livelihoods

Miners obtain most of their income from mining activities. The majority of miners are sole breadwinners (70%) though non-miners are also the only income earner in the family (54%). The spending behaviours of miners and non-miners are quite similar with the largest expenditures being on their families' upkeep and settlement of debts. However miners are naturally more likely to invest more in mining activities though investments in other income generating activities are similar for the two groups. Mining fees and taxes make up a small expense for miners.

The main alternative income generating activity for miners is farming with small trade, gardening and livestock keeping being other significant activities. 56% of miners invest in other income generating

activities as compared to 60% of non-miners. These are significant proportions when one considers that only 12%[209] of employed Zimbabweans engage in other income generating activities.

In 2006 the Global Mercury Project conducted a baseline survey in Kadoma-Chakari. Below some of their findings are compared with this study:

	GMP Baseline Survey (2006)	**Pact Baseline Survey (2014)**
Family expenditure	68% of income	78% of income
Investment in other income generating activities	10% of income	32% of income

It is interesting to note that the GMP Baseline also notes farming as the most common other income generating activity that miners engage in. However a point of departure is where the GMP discovered that many miners are also mill workers since mill operations are done through-out the year. This is something that this study did not observe.

Miners save more money (USD 60.28 per month) than non-miners (USD 32.51 per month) probably due to the fact that they earn more on average. The GMP Baseline Study found out that, to a large extent, the wages earned by artisanal miners are much greater than their rural agricultural alternatives (farming) - often five times as high. This corroborates our baseline findings which show that miners spend more on their families and still save twice as much as non-miners.

A 2011 survey conducted by FinScope discovered that 38% of Zimbabweans are served by formal banking institutions and 40% of the population is financially excluded from both the formal and informal financial products/services. In rural areas, 51% of the adult population was financially excluded while only 12% of the rural adult population used commercial banking services. It was also discovered that 27% of Zimbabwe's adult population keep their savings at home instead of using formal financial savings products.

In 2012 the Ministry of Small and Medium Enterprises and Cooperative Development (MoSMECD) in conjunction with FinMark Trust and the World Bank embarked on a FinScope Micro, Small and Medium Enterprise (MSME) survey. The Survey found that there are 2.8 million MSME in Zimbabwe,

[209] *2011 ZIMSTAT Labour Force Survey. The study noted that "the rate was higher in rural that in urban areas." It was discovered that 34 percent of these activities are in agriculture, forestry and fishing.*

of which 57% of MSME are financially included but only 18% access credit, savings or insurance from formal financial institutions.

Women (both miners and non–miners) have a higher likelihood of making monthly savings than men.[210]

The table below compares some findings from these two surveys and this study. Miners are compared to rural individuals while millers are compared to MSME.

2011 FinScope Survey	**Baseline Findings**	
	Miners	**Non-miners**
12% of rural adult population use commercial banking services	4.1 % of miners save their money in a bank	3.9% of non-miners save in a bank
27% of Zimbabwe's adult population keep their savings at home	24.5% of miners keep their savings at home	20.4% of non-miners keep their savings at home
	20.7% of miners save their money using mobile banking services	11.8% of non-miners save their money using mobile banking services
2012 FinScope MSME Survey for Zimbabwe	Millers	
57% of MSME use commercial banking services	19% of millers save their money in a bank	
72% of Zimbabwe's 2.8 million MSME save at home	17% of millers keep their savings at home	
	23% of miners save their money using mobile banking services	

Table 11: Comparison of Baseline Findings and FinScope Findings

The majority of respondents are unbanked. Half of the miners and 41% of millers do not make monthly savings which shows that there is a significant proportion of players who are only making a sustenance from ASM and who also need financial management training. While for those who are making monthly

[210] *Once again an independent t-test with no equal variance assumed was performed to determine if statistically sex of respondent or type of respondent did have an effect on monthly savings. The results showed a statistically significant difference in both cases i.e. miners (M = 1.26, SD = 0.56) and non-miners (M=1.13, SD = 0.43), conditions t (3.08) = 613.919, p = 0.02 as well as men (M =1.23, SD = 0.56) and women (M = 1.12, SD = 0.37) conditions; t (2.95) = 493.920, p = 0.03.*

savings, mobile banking seems to be more popular than commercial banks. Miners struggle to access loans from financial institutions whereas millers tend to have better access. As on miller who is a former banker, put it, "*Banks are not willing to invest in the mining as it is too risky and they don't understand it. They will however invest in the processing and give millers loans."* Millers are 5 times more likely to save their money in a bank than miners. Miners and millers also reported saving money at home which puts the savings at a higher risk of being spent or lost. The figure below provides a comparison of places where miners and millers keep their savings.

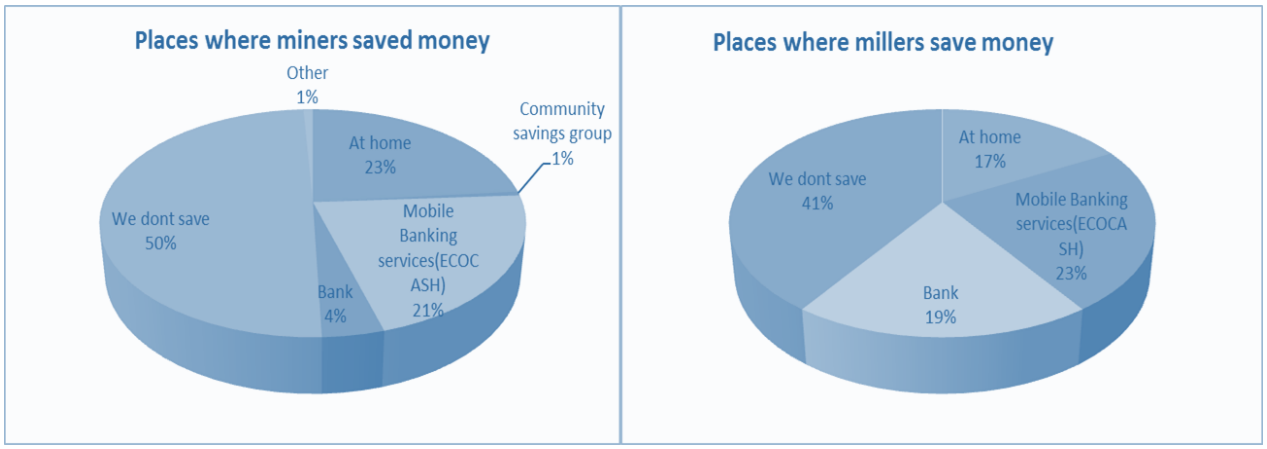

Figure 33: A comparison of how miners and non-miners save money

Income and expenditure

To understand miners' livelihoods, the baseline survey collected data on main sources of income as well as other income generating activities, household expenditures on basic services, savings culture among miners as well as household food security. The data was collected from miners and non-miners' households using the latter as a control group for the purpose of comparing the social and economic status of miners and non-miners' families and thus understanding the contribution of mining towards local livelihoods.

The survey revealed that 58% of miners are sole breadwinners as compared to 42% of non-miners. For both groups, for the married miners, the majority of expenditure decisions are made jointly by spouses.

The data on households' main source of income show that half of all mining family respondents depend solely on mining. For those who had supplementary sources of income, 22% were farmers and 11% were doing small/petty trade. The charts below compares the main sources of miners and non-miners.

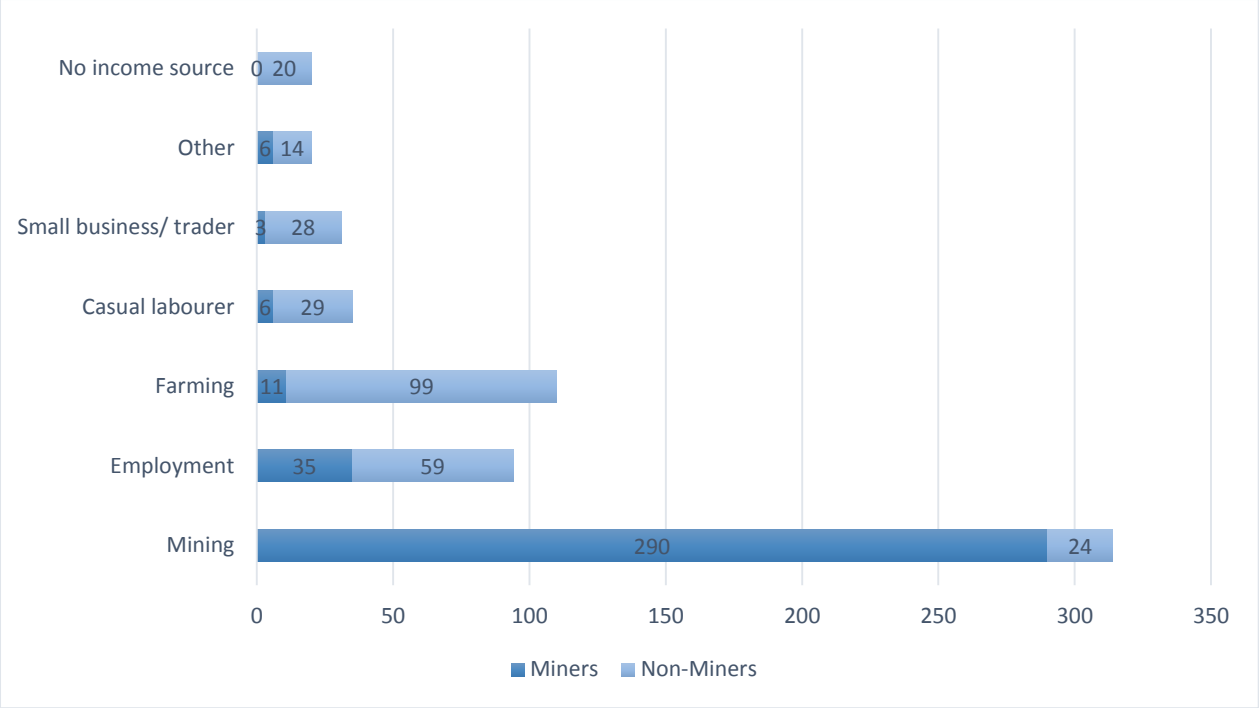

Figure 34: Comparison of Main Source of Income between miners and non-miners

The figure below provides summary of how miners get paid for the work they do. The results show that the majority of miners (64%) are paid their share in cash. Very few miners (2%) reported that they actually share the gold ore itself and process it independently while 3% reported that they share the processed gold and sell independently. 14% of miners receive a monthly salary while 55% reported having control of all the minerals produced. 11% reported other means of payment which included farmers who controlled all the money made, spouses who received money from their husbands' payments, and cash for services rendered e.g. sale of explosives. The formal market works on a payment-in-cash basis thus the project should seek to incentivize miners who prefer to obtain their payment in other forms to obtain it in cash.

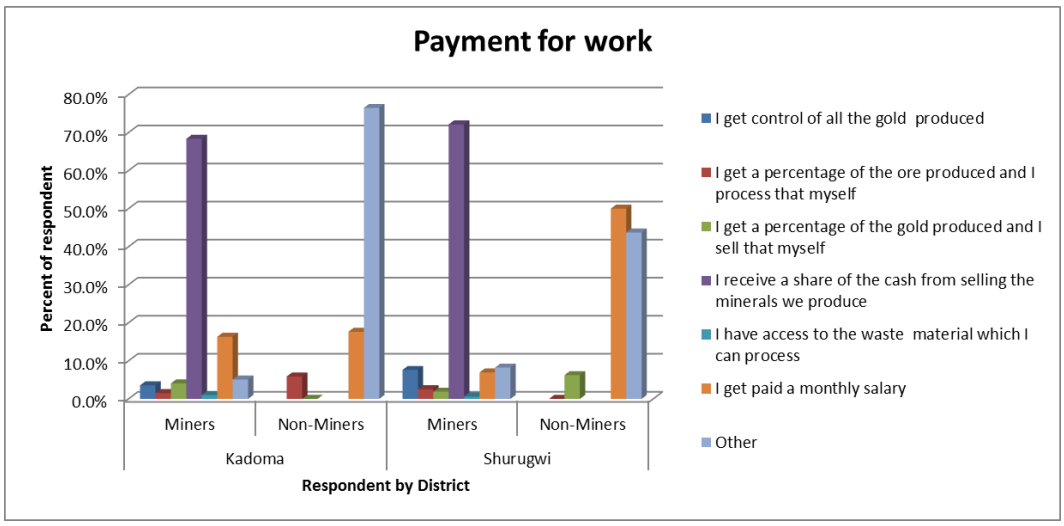

Figure 35: Modes of payment for work done

After earning their income, the survey compared how miners and non-miners spend their income. Miners and non-miners exhibit strong similarities in their expenditure on their families, debt repayment and investment in other income generating activities. Naturally, miners spend more on mining taxes/payments and are more likely to invest in mining than non-miners (three times more likely). However the surprising result is that miners are more likely to invest in other income generating activities than in mining - 12% of miners said they invest in other income generating activities as compared to 9% who invest in mining. This implies that some miners might see mining as a cash generating activity that provides capital for their other income generating activities which are either more profitable or are their preferred economic activities. This is shown in the chart below:

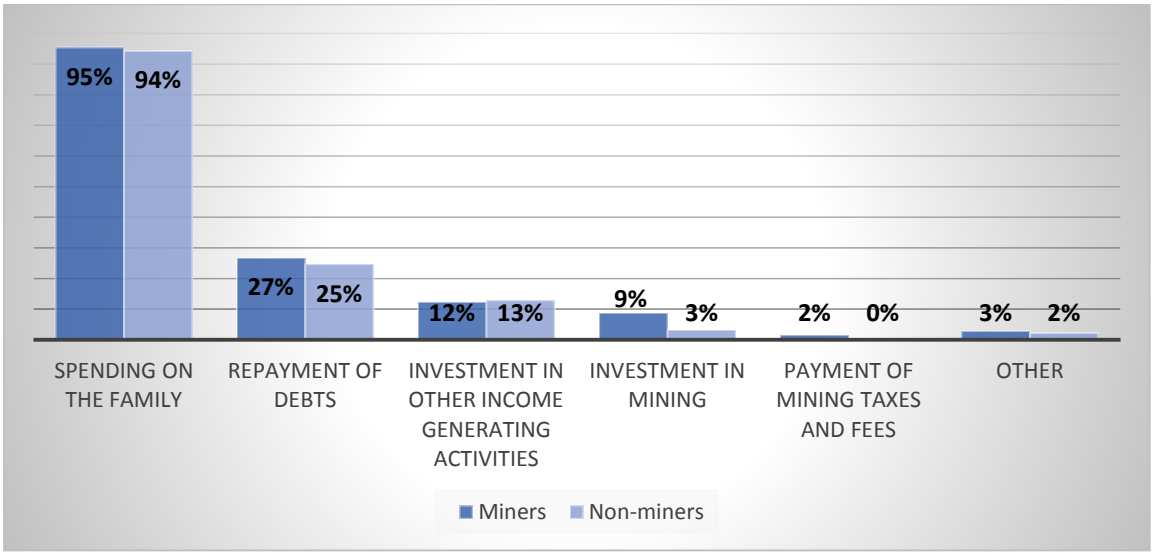

Figure 36: Comparison of expenses by respondent type

Further inquiry into the income generating activities that miners and non-miners were engaging in revealed that there is a strong correlation in how the two groups invest. This is shown in the chart below:

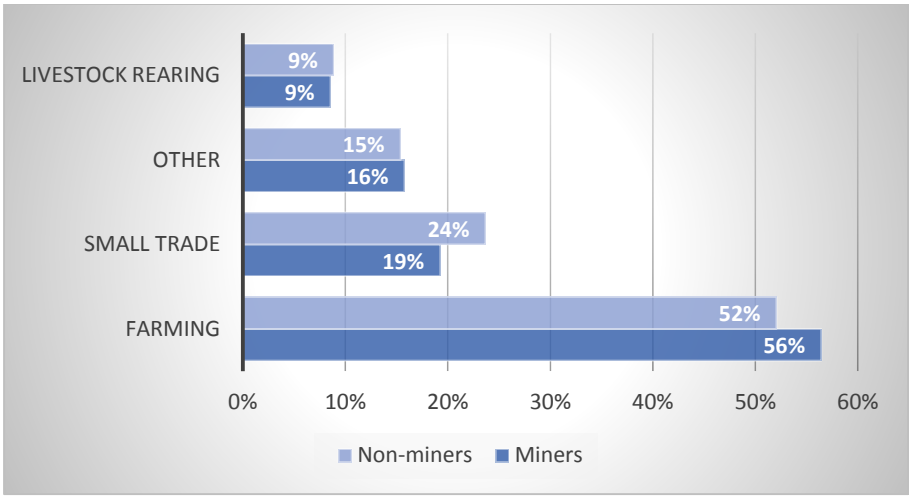

Figure 37: Other Income Generating Activities

The survey went further to enquire the other income generating activities that miner and non-miners would like to engage in, capital permitting. The results again show that there is a strong correlation between how miners and non-miners would like to invest. The results also reveal the perceptions of profitability/social-acceptance of different income generating activities – 72% of miners believe such activities would be more profitable than mining while 14% believe it would be lower. The desired income generating activities are shown in the chart below:

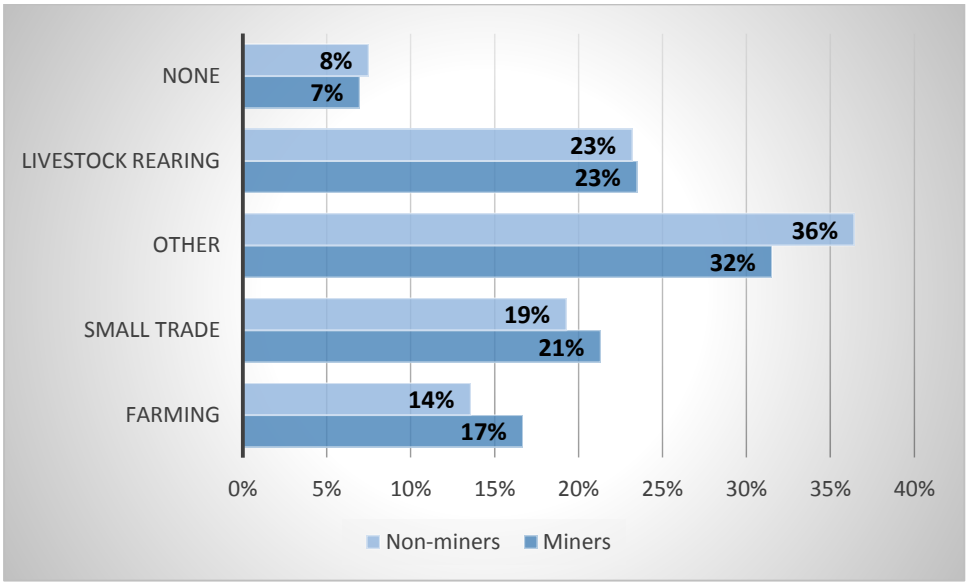

Figure 38: The income generating activities that miners and non-miners would like to engage in

Miners and non-miners identified very similar constraints to pursuing their desired income generating activities as shown below:

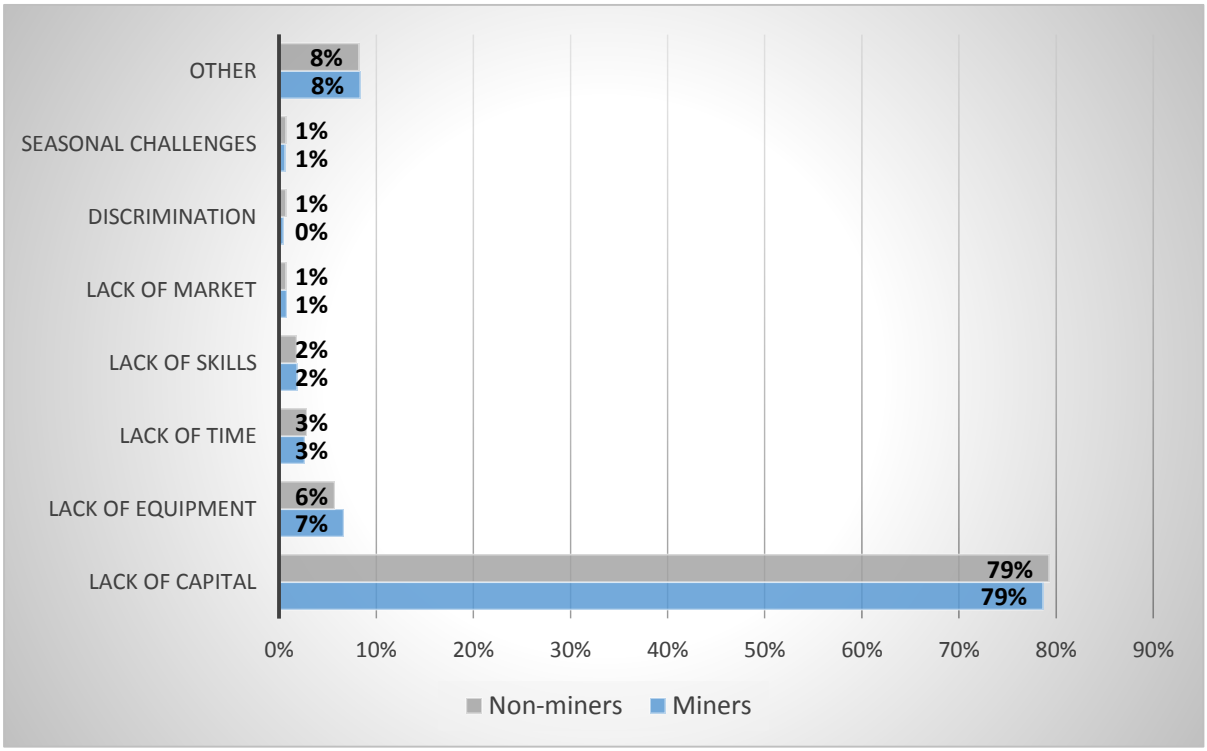

Figure 39: Constraints that miners and non-miners face in pursuing their desired income generating activities

Data on household expenditure on basic services was collected as a proxy indicator for household income. This included expenditure on food, health care, transport, communication and entertainment. The survey also looked at average monthly savings among miners and non-miners households as proxy for income.

Miners spend marginally more than non-miners on foodstuffs, children's education, transport, medical care and communication. Miners also spend twice as much on entertainment than non-miners.

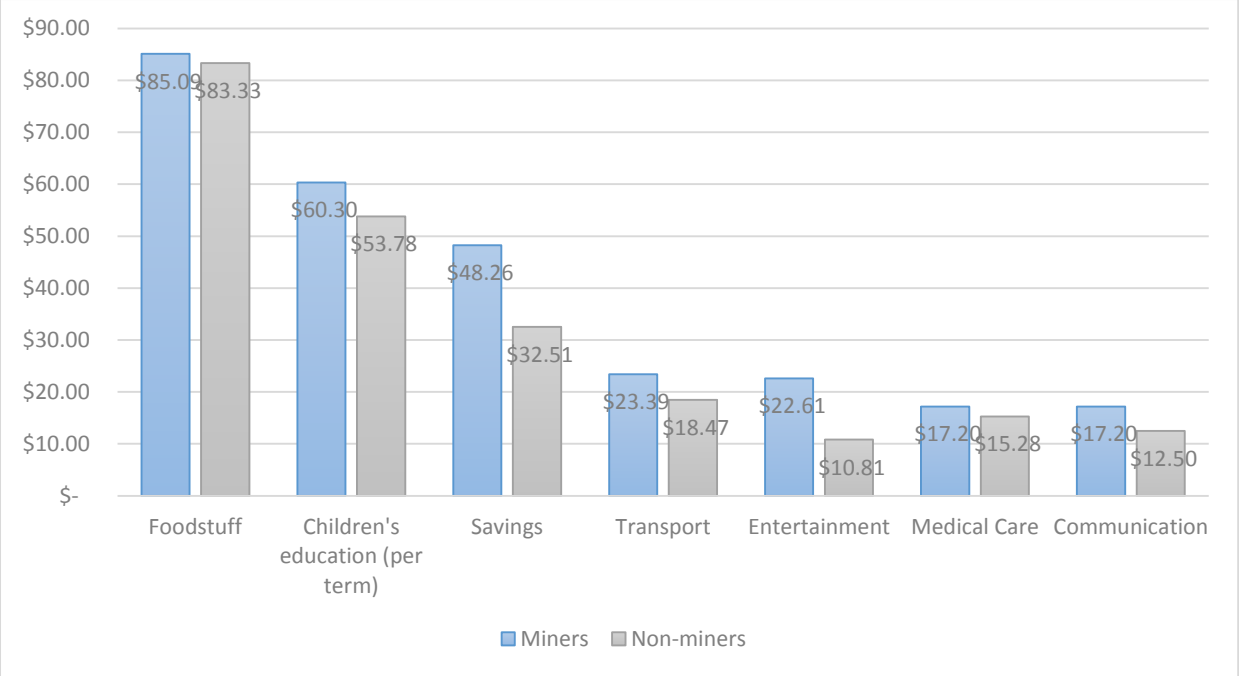

Figure 40: Comparison of average monthly expenditures for miners and non-miners

Miners spend more on medical care than non-miners. This has been observed in other countries such as Tanzania. Miners tend to require a higher-than-average medical attention and the project should consider both safety and health awareness raising and policy interventions that make protect the health and safety of miners. Women (both miners and non-miners) also spend more in medical care than their male counterparts[211].

Household food security

To understand the food security at household level; a composite indicator (food security) was computed out of two indicators adapted from the Global Hunger Index HI[212]. The indicator is a sum of all respondents who reported that they or their family members have slept hungry in the last 30 days preceding the survey due to lack of adequate food and if so frequency of this event happening in the same period of time. The indicator food security is categorized as:

- Food insecure households i.e. those who often slept hungry (more than 10 times in the last four weeks);
- Moderately food insecure households i.e. those that either reported sleeping hungry sometimes (3 – 10 times in the last four weeks) or sleeping hungry rarely (1 -3 times in the last 4 weeks); and
- Food secure households comprising of those that reported to never have slept hungry in the last 4 weeks.

[211] *An independent t-test with no equal variance assumed, showed a statistically significant difference in monthly expenditure in medical care for miners (M = 1.02, SD = 0.15) and non- miners (M= 1.00, SD = 0.06), conditions; t (2.18) = 483.724, p = 0.03. A statistically significant difference was also shown for monthly expenditure for medical care for men (M = 1.02, SD = 0.14) and women (M= 1.00, SD = 0.00) conditions t (3.03) = 435, p = 0.003. This means the sex of respondent and type of respondent did have effect on monthly medical expenses.*

[212] http://www.ifpri.org/book-8018/ourwork/researcharea/global-hunger-index

The data from the food secure indicator shows that 855% of respondents were food secure, 10% were moderately food insecure and 55% were food insecure. The figure below shows the summary of food security data by sex of the respondent.

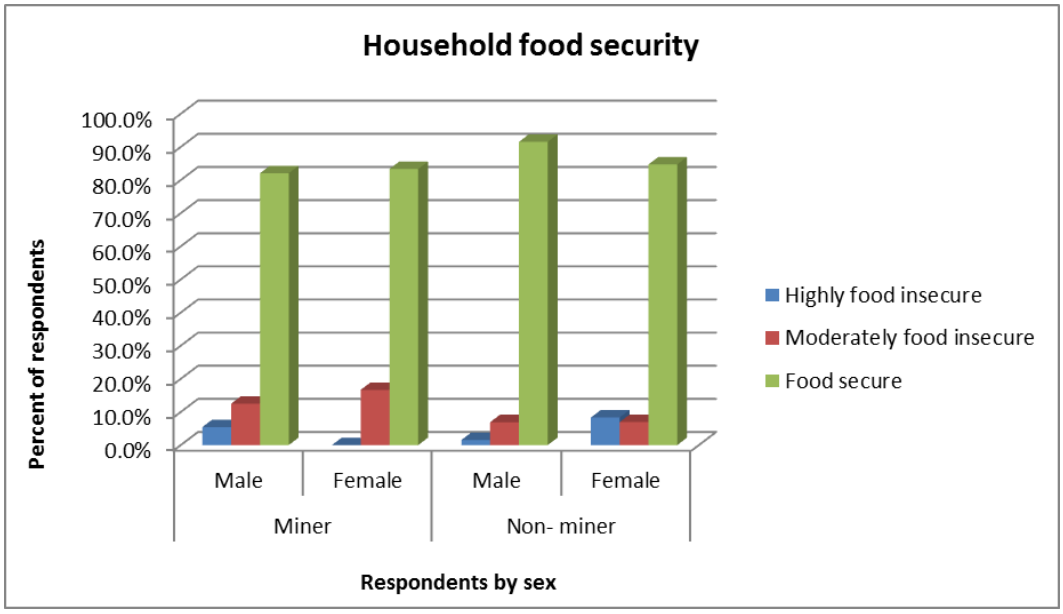

Figure 41: Household food security disaggregated by respondent type and sex

Non mining households are more food insecure than mining households.[213] This stresses the importance of ASM as a rural livelihood, one where Mines are more likely to spend more on food than those who do not engage in ASM .The average number of meals per day for various age groups among family members were sought to further understand the potential effects of food insecurity to younger children being cared for by the respondents. The results show that generally young children 0 – 4 years old living in highly food insecure household have less than 3 meals a day. Considering that young children particularly 0 -1 year old need small but frequent nutritious meals for their growth and development, this calls for further research to understand infant feeding practices in those households and thus potential risk of malnutrition and infant mortality in the families.

In a study in Papua New Guinea, it was found that the reason for the differences in expenditure for the income earned, was due to the fact that women are more concerned with environmental, health and safety issues than men. Furthermore the difference in expenditure is due to the fact that women are more likely to spend mining incomes on children and the running of households than men who are prone to wasting it on drinking, prostitution and gambling.

[213] *An independent t-test with no equal variance assumed was conducted to compare food security in mining and non-mining households. The results showed a statistically significant difference for mining households (M= 2.69, SD = 0.69) and non-mining households (M = 2.81, SD = 0.54) conditions; t (-2.41) = 625.83, p = 0.016. There was no significant difference observed when the same was compared by sex of respondent.*

4.3. Safety, Health & Environment

4.3.1. Occupational Health & Safety

Unsafe Work Practices and Behaviour

One of the most common OSH deficiencies in small scale mining is lack of awareness of the risks in mining coupled with lack of education and training.[214] Lack of skills and resources further compound this leading to very poor health and safety conditions. Over 20 people are killed in the sector in Zimbabwe every year but because neither the Mines Department nor the Chamber of Mines recognize these as mine accidents or fatalities due to the illegal nature of the operations, the data is not collected or maintained. Most of the accidents occur when the unsupported side walls and hanging walls collapse due to undercutting.

Hentschel[215] underscored that non-use of safety equipment is due to lack of awareness, lack of training, non-application of safety regulation, and illiteracy. The same study found that small scale miners purchase their own safety equipment such as helmet, boots, gloves, and face mask. Women miners are particularly at risk as according to Bhagyalakshmi.[216] According to this study, women in small scale mining are not provided with or do not have protective equipment such as masks, goggles, shoes and helmets since they are only involved in ancillary work.

Many small scale mining operations are said to be lacking in the following: applied safety regulations, reinforcement of mine safety requirements, awareness of the risks inherent in mining, and access to better equipment.[217] These risk factors lead to higher health risks and poorer working conditions in small scale mining compared to formal and large scale mining. In fact, the incidence of accidents in small scale coal mining in Africa was found significantly higher than in large scale mines.[218]

Comparing accidents in mining activities between developed and developing countries, the ILO reported that occupational fatality rate in small scale mining in developing countries rose up to 90 times higher than in industrialized countries.[219] In the Philippines, based on the records of Mines and Geosciences Bureau (MGB) in the Cordillera Administrative Region (CAR), fatal accidents in small scale mines were higher than in the large scale mines.[220]

Women, children, and men alike are subject to many work-induced injuries ranging from inhalation of fumes from equipment to broken bones. This is compounded by the limitations on available,

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[214] *(Hentschel, Hruschka, & Priester, 2003)*
[215] *(Hentschel, 2003)*
[216] *Bhagyalakshmi (2007).*
[217] *(Lu, 2012)*
[218] *(Hentschel, Hruschka, & Priester, 2003)*
[219] *(Lu, 2012)*
[220] *(DENR-MGB, 2011)*

Government-funded healthcare while private health clinics are both expensive and nearly inaccessible to many of the rural populations.[221]

Miners who are constantly exposed to airborne particulates are vulnerable to systemic and respiratory diseases. Miners also suffer from musculoskeletal disorders such as back pain. Part of the small scale mining activities is the manual lifting of materials which is usually done by women. This type of work can cause back pain and injuries.[222]

In the shafts, miners are exposed to immense heat, cave-ins, and faulty machinery. Air is a critical commodity in the shafts which reach deep underground and this causes respiratory health problems for the miners. The vast majority of the workers do not use a proper breathing apparatus.

Figure 42: A safety sign at a mine in Shurugwi

Mine Accidents and Injuries

Mining is considered by ILO as one of the most unsafe human activities. The leading types of accident in the mines are - being hit by falling objects, suffocation from chemical fumes, and crushing injuries.[223] Other occupational health hazards in mining include exposure to intense heat, poor ventilation, vibration, dust, fumes, repetitive stress injury (RSI), intense noise, and biological hazards. In underground mining, poor ventilation causes respiratory failure that can cause brain malfunction or even death.

[221] *(Greece, 2012)*
[222] *(Chakravorty, 2001)*
[223] *(Lu, 2012)*

Most of the relevant causes of accidents among small scale miners are rock falls and subsidence, use of poorly maintained equipment, and non-compliance on wearing proper protective equipment, and safety practices. Erosion, suffocation, poisoning, explosion, and being trapped or buried are among the most common accidents.

Many miners use hammers and chisels to extract gold from the shafts and this results in numerous hand, joint and other musculo-skeletal injuries. The few who do use machines, use compressors and pumps which are often pre-used, obsolete and faulty and fall way below the regulatory emission standards.[224]

Mining accidents in ASM are prevalent and often go unreported due to the illegal nature of the operations. The baseline study found that 31% of the miners had witnessed or had in an accident been involved. 38% of miners cited the collapse of waste rock as the most common type of mining accident while 9% cited machinery related accidents. In a study done by researchers from the University of Brussels on Occupational accidents on Artisanal Mining of Luputo in the Katanga Area in the Democratic Republic of Congo, it was found that in terms of OSH the ASM sector continues to be synonymous with mining accidents. In a sample of 180 miners, in the 12 months preceding the studies, 392 accidents occurred which affected 72% of the miners. Half of the accidents were attributed to tools handling whilst carrying of heavy loads accounted for 33% of the accidents reported.

General health

To present data on respondents' general health status, a composite indicator 'respondent's health status' was created out of two indicators i.e. respondents who reported having been too sick to participate in daily activities in the last 30 days preceding the survey and frequency of occurrence of such incidences. The indicator is categorised as following;

- Chronic/recurrent illness which included respondents who reported being too sick to participate in daily activities in the last 30 days that occurred at least once every week;
- Poor health which comprised of all respondents who reported having been too sick to participate in daily activities in the last 30 days that happened once in a while; and
- Good health which included respondents who reported not having been too sick to participate in their daily activities.

The results for respondents' health status show that around 81% of all respondents generally have good health. Around 17% have poor health and 2% are either chronically ill or have recurrent illnesses. The results were the same for both men and women from mining and non-mining households with no statistically significant differences observed. This is contrary to assertions in literature that women face higher health risks than men in ASM.

[224] *(Porter, 2010)*

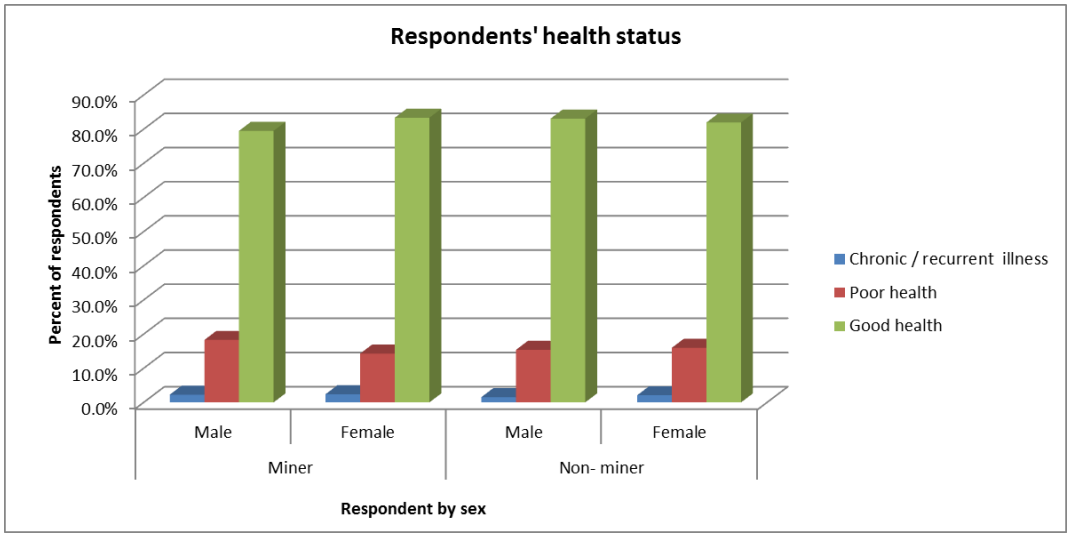


Figure 43: Respondent's health status

[225]Incidences of other recurrent and chronic illnesses were also explored among miners and non-miners' households where respondents were asked whether they have suffered from any of the listed diseases in the last month preceding the survey.

The survey found that miners are more likely to suffer from typhoid fever and pneumonia than non-miners but less likely to suffer from tuberculosis, malaria or diarrhoeal disease. The most surprising result was that miners are less likely to suffer from respiratory disease than non-miners.

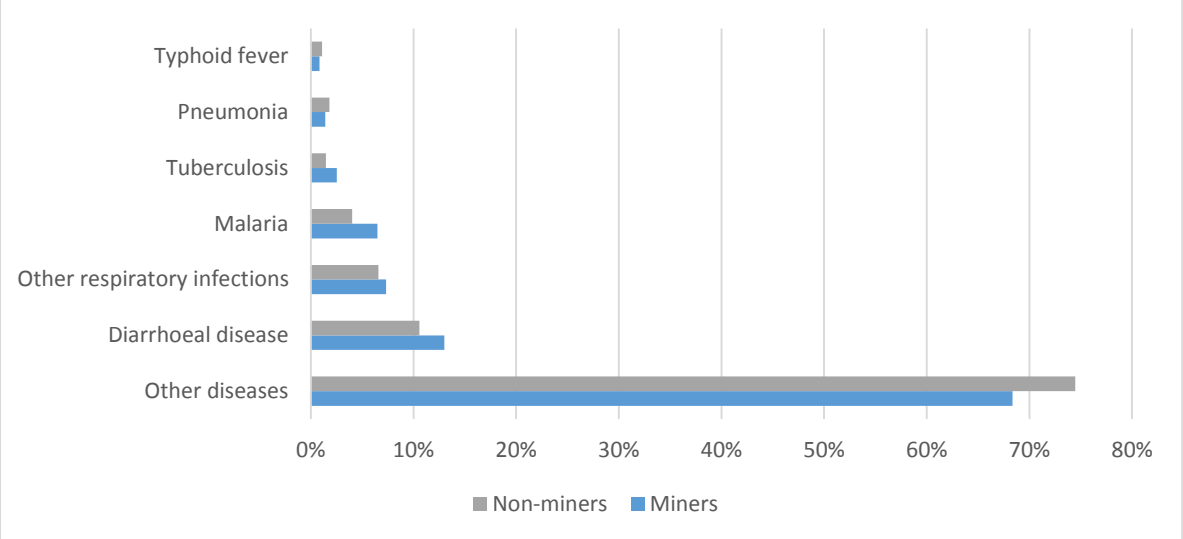


Figure 44: Comparison of common diseases suffered by miners and non-miners

[225] *An independent t-test with equal variance assumed, failed to show statistically significant differences in health status between miners (M= 2.78, SD = 0.47) and non-miners (M = 2.81, SD = 0.44) conditions; t (-0.81) = 626, p = 0.42. The test also failed to show differences among men (M= 2.79, SD = 0.46) and women (M = 2.80, SD = 0.45) conditions; t (-0.40) = 626, p = 0.69. This means that any observed difference is simply by chance and that sex of the respondent or type of respondent didn't have any effect on health status of respondent.*

Respondents we also asked about HIV including whether they have ever been tested for HIV and if so when was the last time they took a HIV test. Respondents who reported having taken HIV test were asked if they are willing to share their test results before being asked about their HIV status. The results show that 73% of respondents had been tested for HIV out of whom 59% were tested for HIV less than 6 months ago and 21% took HIV test between 6 months to 1 year ago. Of the people who have tested for HIV, 90% of miners and 87% of non-miners were willing to share their test results. Of those who shared their results; 12.3% of miners and 12.2% of non-miners were living with HIV[226]. UNICEF estimated that Zimbabwe has an HIV prevalence rate of 13.7%. This is contrary to findings elsewhere where mines, and oftentimes communities surrounding them, are HIV/AIDS hotspots.

On the issue of health education, women miners reported that there's no education on HIV/AIDS, STIs, Sexual Reproductive Health or family planning services. "*Also there's no sanitary ware in the bush. There are reports of distribution of condoms that is said to be done haphazardly. Routine HIV/AIDS counselling and testing is also available for example through the NAC which is from the 22nd of October to the 2nd of November.*"

Occupational health

Data was collected on respondents' awareness of health hazards of mining including effects of mercury and cyanide on their health. Other data collected were on symptoms related/suggestive of mining related illnesses and mining accidents. The results show that there is generally high level of awareness (72%) about the potential health impact of mining in miners' health.

Miners were asked if they knew about the health problems that are related to cyanide use. The responses showed that 54% of miners know about the cyanide effect on their health. Moreover 6.7% of miners have used cyanide at home which exposes families to the risks of cyanide poisoning. On whether miners have faced health problems related to cyanide use, 3.4% of miners said yes. The table below provides detailed summary of awareness and cyanide use among miners by district.

Awareness about cyanide		District				Total
		Kadoma		Shurugwi		
		Male	Female	Male	Female	
Knowledge about health problems related to cyanide use	Yes	112 (59.9)	8 (30.8)	85 (59.0)	4 (13.3)	209 (54.0)
	No	75 (40.1)	18 (69.2)	59 (41.0)	26 (86.7)	178 (46.0)
Sub - Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)
Have you or a family member ever used cyanide at home?	Yes	4 (2.1)	0 (0.0)	21 (14.6)	1 (3.3)	26 (6.7)
	No	183 (97.9)	26 (100)	123 (85.4)	29 (96.7)	361 (93.3)
Sub - Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)
Have you ever faced health problems related to cyanide use?	Yes	5 (2.7)	1 (3.8)	7 (4.9)	0 (0.0)	13 (3.4)
	No	182 (97.3)	25 (96.2)	137 (95.1)	30 (100)	374 (96.6)
Sub - Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)

Table 12: Awareness about cyanide

When miners were asked whether they knew the health problems related to mercury, only 46% of miners said yes with men (56% in Kadoma and 41% in Shurugwi) appearing to be much more

[226] *UNICEF estimates that Zimbabwe has an HIV prevalence rate of 13.7%*

knowledgeable about impact of mercury than women (39% in Kadoma and 17% in Shurugwi). There is a higher awareness around mercury in Kadoma due to the Global Mercury Project which was conducted in the area a decade ago. Nearly 18% of respondents have burned amalgam at home and only 11% have ever used a retort when burning mercury. 3% have experienced health problems which are typically related to mercury exposure. The table below shows the summary of responses on mercury.

Millers were also asked if they knew of any alternative to the use of mercury for gold processing. The results show that majority of millers (64%) didn't know an alternative to mercury whereas cyanide leaching and gemini[227] tables were alternatives mentioned by several miners. The figure below shows millers responses on alternatives to mercury.

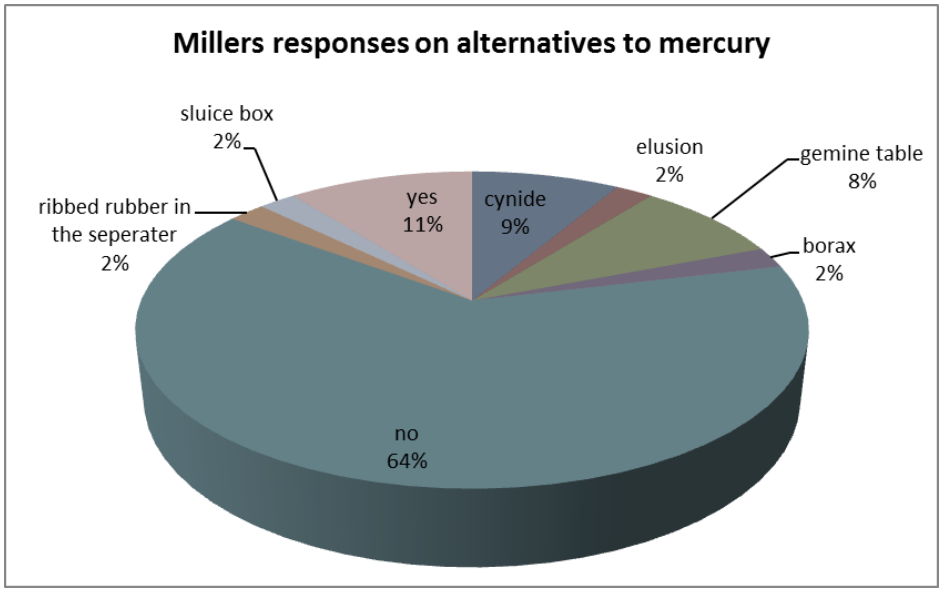


Figure 45: Millers' responses when asked if they knew any alternatives to mercury

Respondents were asked if after working in mining they have experienced any symptoms that are suggestive of mining related effects. The results show that 23% have experienced headaches, dizziness and blurred vision while 12% have experience skin irritation and sores. Nearly 26% of respondents reported muscle pain and weakness.

The survey also collected data on mining related accidents to understand its incidences and impact. Five questions were asked around mining accidents including whether miners have witnessed a mining accident and frequency of occurrence of accidents. Other questions were about the common types of mining accidents and lastly whether the respondent (in person or family member) have ever suffered a mining accident.

From the results, 31% of respondents have witnessed mining accidents while 1.6% chose not to respond to the question. About 19.4% of respondents have either themselves or their family members suffered from mining accidents. From those who have suffered from mining accidents, 28.0% had significantly severe accidents involving broken bones, concussions and major wounds while 1.3% were in severe accidents that resulted in person's inability to return to mining work. The most common type

[227] *Miniature James Tables*

of mining accident is the collapse of waste rock onto someone as reported by 38% of respondents. This was followed by tunnel or shaft collapse as reported by 14% of respondents.

		District				
		Kadoma		Shurugwi		
		Male	Female	Male	Female	Total
Witnessed or involved in mining accident	Yes	55 (29.4)	7 (26.9)	53 (36.8)	5 (16.7)	120 (31.0)
	No	127 (67.9)	15 (57.7)	89 (61.8)	18 (60.0)	249 (64.3)
	I dont know	1 (0.5)	4 (15.4)	1(0.7)	6 (20.0)	12 (3.1)
	No answer	4 (2.1)	0 (0.0)	1 (0.7)	1 (3.3)	6 (1.6)
Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)
Frequency of mining accidents	At least once every one week	0 (0.0)		1 (0.7)		1 (0.3)
	At least once every month	4 (2.1)	1 (3.8)	5 (3.5)	0 (0.0)	10 (2.6)
	At least once every three months	20 (10.7)	2 (7.7)	7 (4.9)	0 (0.0)	29 (7.5)
	At least once every six months	29 (15.5)	4 (15.4)	4 (2.8)	1 (3.3)	38 (9.8)
	Rarely	72 (38.5)	9 (34.6)	70 (48.6)	8 (26.7)	159 (41.1)
	No accidents	36 (19.3)	2 (7.7)	47 (32.6)	13 (43.3)	98 (25.3)
	I dont know	19 (10.2)	7 (26.9)	7 (4.9)	6 (20.0)	39 (10.1)
	No answer	7 (3.7)	1 (3.8)	3 (2.1)	2 (6.7)	13 (3.4)
Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)
Most common type of mining accident	Drowning because of sudden flood	2 (1.1)		2 (1.4)		4 (1.0)
	Tunnel or shaft collapse	27 (14.4)	1 (3.8)	23 (16.0)	3 (10.0)	54 (14.0)
	Collapse of waste rocks onto someone	81 (43.3)	14 (53.8)	47 (32.6)	6 (20.0)	148 (38.2)
	Machine - related accident/injury	10 (5.3)	1 (3.8)	20 (13.9)	5 (16.7)	36 (9.3)
	Explosives accident	4 (2.1)		3 (2.1)		7 (1.8)
	Accidental falls into pits or shafts	18 (9.6)	1 (3.8)	10 (6.9)	0 (0.0)	29 (7.5)
	Wildlife interactions (snakes or insects bites	2 (1.1)		2 (1.4)		4 (1.0)
	Assaults from other miners	9 (4.8)	2 (7.7)	2 (1.4)	0 (0.0)	13 (3.4)
	Burn	0 (0.0)	0 (0.0)	2 (1.4)	1 (3.3)	3 (0.8)
	Other	34 (18.2)	7 (26.9)	33 (22.9)	15 (50.0)	89 (23.0)
Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)
Injured in a mining accident	Yes, minor injuries (cuts, bruises, sprains)	36 (19.3)	2 (7.7)	15 (10.4)	0 (0.0)	53 (13.7)
	Yes, significant injuries (broken bones, concussion, major wounds)	12 (6.4)	1 (3.8)	7 (4.9)	1 (3.3)	21 (5.4)
	Yes, an injury which was so severe that it prevented the person from returning to work	1 (0.5)		0 (0.0)		1 (0.3)
	No	138 (73.8)	23 (88.5)	122 (84.7)	29 (96.7)	312 (80.6)
Total		187 (100)	26 (100)	144 (100)	30 (100)	387 (100)

Table 13: Mining accidents

When discussing health and safety in the mines, miners in Kadoma reported that many accidents occur. Miners can be asphyxiated, ropes and safety equipment can break, tunnels collapse, and miners including children fall when descending shafts. Fights are also reported and drunken people fall into pits. When large scale mines are closed, people may start going underground and mine-out the pillars causing catastrophic mine collapses. Key informant interviews with nurses in a health centre near a mining site revealed that most of the mining related accidents that happen in the area are physical injuries to limbs and digits. There is a need for awareness raising and training around occupational health and safety.

Water, hygiene and sanitation

Water, hygiene and sanitation (WASH) related data was also collected as part of the baseline survey. In this aspect, respondents were asked about the sources of water for the households, whether drinking water is protected, availability of latrines and personal hygiene practices.

From the results, 39% of respondents' households get water from a machine drilled well with a pump, 27% from hand dug wells and 18% have access to piped water. It appears that more non miners (61%) in Kadoma have access to machine drilled wells with pumps than their mining counterparts (53%) in Shurugwi. The table below provides the summary of water sources for mining and non-mining households by district.

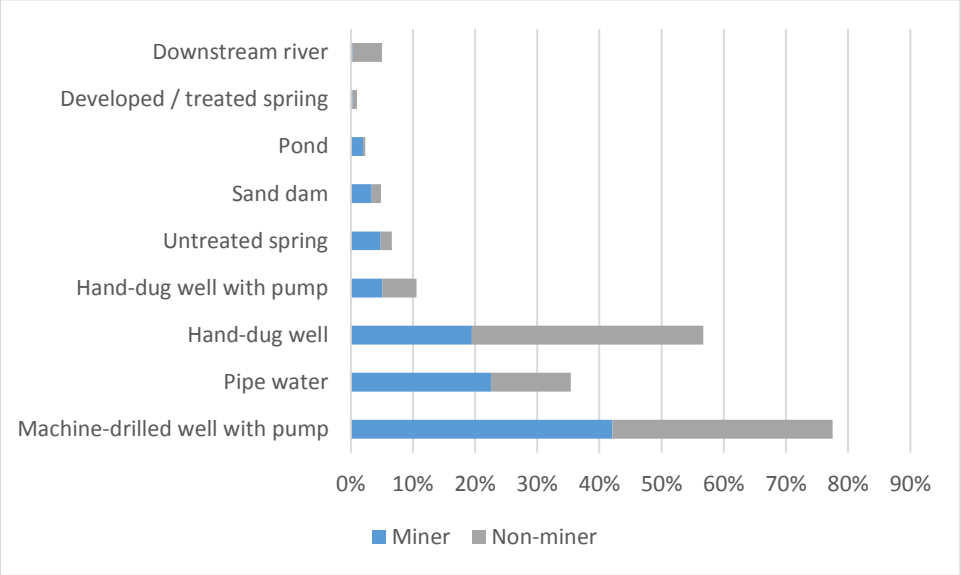


Figure 46: A stacked chart comparing sources of water for mining and non-mining households

Contaminated drinking water is one of the easiest ways that people can get faecal-oral diseases. 355 of miners and 52% of non-miners get their water from unprotected water sources. The table below shows the proportions of miners and non-miners using water from these unprotected water sources:

Table 14: Sources of water for mining and non-mining households

Water Source	Miner	Non-miner
Hand-dug well	19%	37%
Hand-dug well with pump	5%	5%
Untreated spring	5%	2%
Sand dam	3%	1%
Pond	2%	0%
Developed / treated spring	0%	1%
Downstream river	0%	5%

The findings show that 70.4% of respondents do not treat/protect their drinking water while 23.1% are using chemicals such as chlorine for treating their drinking water, 0.3% of miners used traditional

herbs to treat water, 6.1% are boiling their drinking water. On asking why respondents were not treating their water, 17% of respondents didn't have any reason for not treating their water while 64% felt that the water is clean. A high cost of water treatment chemicals was a reason that made 14% of miners not to treat their water. The table below provides a summary of findings for protecting/ treating drinking water and reasons for those who don't protect their water.

To understand respondents' personal hygiene practices, the survey collected data on frequency of taking baths and face washing. For the bathing practices, it was interesting to note that 14% of miners in Kadoma are washing at least once a week. Considering the physical nature of artisanal and small scale mining as well as Kadoma climate, this is potentially an indication of incidences of some skin diseases among miners. Overall 91% of miners bathed at least once every day. In terms of face washing, majority of respondents (44%) washed their faces once or twice a day while 33% reported not washing their faces every day. The table below provides details of personal hygiene by respondent type.

In terms of availability of latrines for the households, 67% of respondents reported having latrines for the households and 99% of respondents who reported having latrines for the households said the latrines are within a distance that is less than 1 km. Out of those who have latrines at home, 52% have hand washing facilities near the latrine. Hand washing practices were characteristically with or without soap.

4.3.2. Environmental impact

There is no doubt that ASM has contributed significantly to land degradation, deforestation, and air and water pollution. Miners often shift from one place to the other once the high value ores are exhausted or once the extraction becomes impossible, without rehabilitating the mined-out areas.[228] This practice causes physical environmental damage of the actual mine site as well as to rivers, weirs, dams and land downstream.

Environmental degradation generally occurs in the following ways:

- Land Degradation - Small-scale and artisanal miners occupy and utilize approximately 0.005% of Zimbabwe's total land in use and they move about 10 million tonnes of rock material per year. At least 80% of the operations are open cast or shallow pits[229] in depth and are left behind in uncovered and unprotected trenches. The chrome miners on the Great Dyke have a major impact in this regard.[230]
- Soil Erosion - ASM can cause the drying of topsoil within kilometres of the open pit and severe soil erosion with subsequent, and potentially catastrophic, flood events. Most of the material moved by artisanal miners ends up in the streams and dams as silt. Some dams and weirs have been known to silt completely within five years. The 2000/01 floods that affected Mozambique, South Africa and Zimbabwe are believed to have been exacerbated by siltation and deforestation within certain riparian states. The absence of common water standards in the SADC region means that there will always be disagreement as to what water quality ought to be or how and where it should be tested. Soil erosion aids the movement of tailings into valleys and waterways. Additionally, the decrease in soil pH due to acidic runoff and the high heavy metal concentration makes the soil unsuitable for organisms and plant growth.

[228] *(Maponga, 1995)*

[229] *less than 30 metres*

[230] *(Maponga, 1995)*

- Vegetation Destruction - Gold panners are usually nomadic and whenever they discover a lucrative panning area, they construct makeshift homes out of poles and mud, using local trees. In addition, almost 100% of their fuel needs comes from wood.
- Some small-scale miners use mercury to recover the gold. Mercury is released into the environment through direct disposal as well as through vapour. This bio-accumulating toxin contaminates surrounding and downstream river systems thereby posing a danger of poisoning plant and animal life dependent on these river systems for survival, including humans who eat fish from the rivers.

Figure 47: Land degradation caused by ASM in Kadoma

Mercury

Small mining and milling operations in Zimbabwe that use both mercury and cyanide have existed since the 1870s.[231] This predates the colonial era.

Mercury is a highly potent neurotoxin that adversely affects the function and development of the central nervous system in both human beings and wildlife. Exposure to mercury is particularly dangerous for pregnant and breastfeeding women, as well as children, since mercury is most harmful in the early stages of development. ASM is the world's second greatest source of atmospheric mercury pollution after coal combustion.[232]

Beside air pollution, water and soil pollution from mercury has also increased exponentially with over 200 million ASM dependent on mercury to recover free gold. Use of mercury was largely unknown especially in gold panning 30 to 35 years ago due to the coarse nature of the alluvial gold.[233] However, as the rich high grade areas have been continuously reworked, or finer or lower gravel grades are treated, so the gold recovered is in turn much finer and harder to concentrate. Gold panners and

[231] *(Phimister, 1975).*

[232] *(Schmidt, 2012)*

[233] *(O. Maponga: 2006)*

small-scale miners use mercury fairly extensively during the gold recovery process. After crushing gold ore and concentrating it, miners mix the powder with mercury and water in a pan. The mercury attracts the gold particles, creating a gold-mercury amalgam. During this process, miners are in direct contact with mercury through any cuts or sores on their skin. Miners then burn the amalgam to evaporate the mercury and recover the gold and, during this process, they may inhale mercury vapour. In Zimbabwe, it was observed, conversed and recorded that mercury is mostly used on: milling centres; homesteads (home bases where women and men do hand milling and use the mercury during the process) and also on mine sites (for testing samples and recovering gold from high grade ore)

Global Mercury Project

In 2002, the Global Mercury Project was started as a project of the UN Industrial Development Organization (UNIDO) working with the MMMD and Mining Development and the Institute of Mining Research. In 2002, FPR was selling mercury to small-scale miners.

It was discovered that 46% of miners know about the effects of mercury use while 54% do not know. This reflects a decrease in awareness of the effects of mercury over the past decade as the GMP Study found out in 2006 that 61% of miners were aware of the effects of mercury while 39% did not know. While the Baseline Study did not measure ambient mercury levels in the air or water sources, the 2006 GMP study found the following levels of mercury at a mill in the Kadoma-Chakari area:

Parameter	Sample site	Hg Concentration (mg/litre)	Recommended threshold levels. SAZ/WHO. ZINWA. Standards (mg/litre)
Mercury	Seepage from water pond (a)	2.13	0.02
	Trailing impoundments(b)	1.14	0.02
	Stream down the mill (c)	0.13	0.02

Table 15: Mercury concentrations (ml/litre) for the effluent water sample from the stamp mill. Source: Gold Mercury Project

The sample data was collected from different points from effluent water discharged from the stump mill which uses mercury in the amalgamation of gold. With a standard threshold level of 0.01, the above figures show that mercury is above the stipulated limits. This leads to the assertion that water sources within the community are polluted with heavy metals, hence any use of open water is likely to pose mercury concentrations in the blood stream or its bio-accumulation in the case of animals.

The project sought to establish a 'Train-the-Trainer' programme in gold mining communities in the Kadoma-Chakari area to reduce and/or manage the use of mercury in ASM. The project facilitated educational services on issues ranging from pollution-reduction technologies to business and organisational training. GMP in essence adopted a research based strategy in order to achieve the 'Protect Myself, Protect My Children' skills based health enhancing behaviour change curriculum.

The findings of the project suggest that Zimbabwe has some of the highest levels of mercury pollution and human exposure to toxic risks. In a sample of miners examined for mercury poisoning in a study in Insiza Mining District[234] it was found out that 60% of the population had general body weakness,

[234] *(ITDG, 1998)*

55% had symptoms of nausea, 50% had lost teeth, 45% had a history of respiratory distress and 40% had high salivation and tremors, 40% had high mercury levels in hair and 30% had high mercury levels in blood. These symptoms are associated with occupational mercury poisoning. This is not surprising, when considering how carelessly mercury is being handled by the miners in the sector.

A positive finding from the project was that Zimbabwe also had some of the highest levels of education, literacy and infrastructure in the mining sector which could help in developing formalisation programmes.

The GMP partnered with the MMMD, providing special funding to the Institute for Mining Research to scientifically prove that low-cost vinyl loop carpets are more efficient than copper plates, and to determine the optimum amount of cyanide necessary to recover all the gold while minimizing the dissolution of mercury in amalgamation tailings. A statutory instrument banning whole ore amalgamation was to be promulgated following the introduction of the carpets to miners and millers by the MMMD' metallurgists in 2008, however this never materialized.

The GMP faced challenges in achieving its objectives in Zimbabwe and lessons to be learnt from the GMP include:

- The uniqueness of each ASM site is crucial and, as such, the climatic, geological, political and cultural differences of each area has to be considered and adopted as these vary geospatially from one region to another;
- It is essential to include 'local content and/or solutions' in the interventions that might be suggested, engaging all government institutions at various levels of authority (from Senate, Parliament even down to RDCs);
- It is critical it is to engage ASM in a long term commitment (mutual relationship) and involve them in the formulation of the interventions; and
- Implementing projects at a regional level (for instance, through SADC) allows forward and backward linkages to be established as well as strong synergies with multilateral benefits.

Cyanide

Cyanide is an under-rated, highly toxic element that is found both naturally and as an introduced contaminant in the environment. Cyanides are naturally occurring substances found in a number of foods and plants and produced by certain bacteria, fungi, and algae. Cyanide is present in a number of compounds such as hydrogen cyanide, sodium cyanide, and potassium cyanide. In Zimbabwe, sodium cyanide is commonly used by artisanal/small scale miners in gold processing of the locked up gold found in sand tailings after stamp milling. Sodium or calcium cyanide type is mostly used at the stamp mills only. Severe exposure to lower concentrations (6 to 49 mg/m^3) of hydrogen cyanide causes a variety of effects in humans, such as:

- Weakness;
- Headache;
- Nausea;
- Increased rate of respiration; and
- Eye and skin irritation.

Environmentally, it is released into the atmosphere and can adversely damage the ozone layer if it is continually released. The result is global warming with change in weather conditions (unpredictable and/or extreme conditions) and consequently climate change with rise in sea levels. Although cyanide

is acutely toxic to human beings, unlike mercury, cyanide is not a cumulative poison and rapidly decomposes in sunlight due to the instability of the sodium and/or calcium cyanide.

Very few small-scale miners are using cyanide for gold recovery as the process is more involving, requiring a high degree of technical input to maintain the right chemical balances that yield high gold recoveries. Cyanide is therefore normally used at the milling centres st and most of them are not properly lined hence the chemical is washed directly into rivers thus causing harm to both humans downstream and animals.

On cyanide use, it was observed that miners and mill workers are aware of the dangers associated with its use. Leach operators and other workers at the mills make it a point to wash their hands after handling cyanide. While walking around some of the milling sites, danger warning signs could be seen displayed to warn people of the presence of cyanide.

The GMP discovered the following levels of cyanide at a mill site:

Parameter	Sample site	Sample Results mg/litre	Threshold levels (SAZ, ZINWA, WHO, Standards (mg/litre)
Cyanide	After tailings impoundments	2.17	0.01
	Turura Stream	0.23	0.01
	Seepage from borrow pit	0.105	0.01

Table 16: Levels of cyanide at a mill site. Source: Global Mercury Project

The presence of cyanide concentrations of 2.17mg/ litre after tailings impoundment means no adequate neutralization is carried out. This implies high cyanide pollution, hence high chances of polluting water sources in the immediate environment.

4.3.3. Monitoring and regulatory framework

In order for formalization of artisanal and small scale gold mining and trading to be effective, there is a need for a strong regulatory and monitoring framework particularly from the Government with support from other stakeholders of the artisanal and small scale mining and trading. The baseline sought to understand the current situation regarding the legal and policy environment, Government agencies monitoring ASM sector in terms of their presence in the mining/milling sites, frequency of visits to the sites, purposes of visits and respondents opinion of the quality of services provided by those Government agencies.

Legal instruments for monitoring ASM

According to ZASMC, the requirements for the environmental impact assessment is not appropriate for the type of work being in ASM so there thus revision of the requirements and education of the miners is needed. ZASMC has proposed that artisanal miners should provide a project proposal that includes specific outlines of environmental protection measures rather than whole package of environmental impact assessment criteria.

Another example of a challenging legal requirement for ASM compliance is the requirement for every mine to have a mine manager who has a diploma or certificate of competency when the reality of ASM income makes it difficult for mines to hire a legally qualified manager.

Government monitoring and supervision of ASM

The Government role in providing supportive supervision and monitoring of ASM activities cannot be over emphasized. Supporting and ensuring compliance to the legal and policy framework as well as mediating relationships among stakeholder groups are key Government roles in ensuring formalized ASM.

From the survey results, 65% of miners reported presence of Government agencies in the mining sites as compared to 94% of millers who reported the same. In terms of the frequency of visits to the sites, almost half miners felt that Government agencies are visiting their sites at least quarterly while a fifth reported visits at least once every six months. 12% said Government agents never visit. From the perspective of millers, over 80% reported a visit at least once a month while fewer than 5% reported a visit at least once per quarter. 14% of millers reported Government agencies presence on full time daily basis noting an example of Police CID minerals.

With regard to the purpose of the visits, a third of respondents reported occupational health and safety education, a fifth reported environmental protection education. Legal checks were reported by 13% of respondents while 8% reported technical inspection of the mine and a further 8% reported disputes/conflict resolution. Only 1% reported tax collection. The figure below shows purposes of visiting mines/mill sites by the type of respondent (miners and millers).

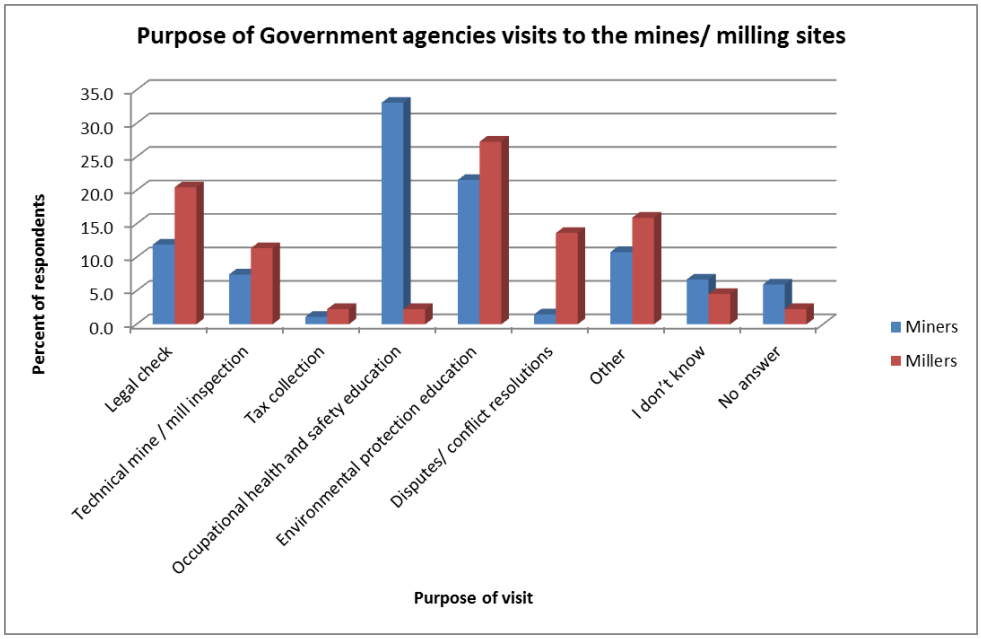


Figure 48: Chart detailing the purposes of government agencies' visits to mines and milling sites

Results on the opinions of miners as compared to the opinions of the millers about the quality of services provided by the Government ASM monitoring agencies are presented in Figure 46 below.

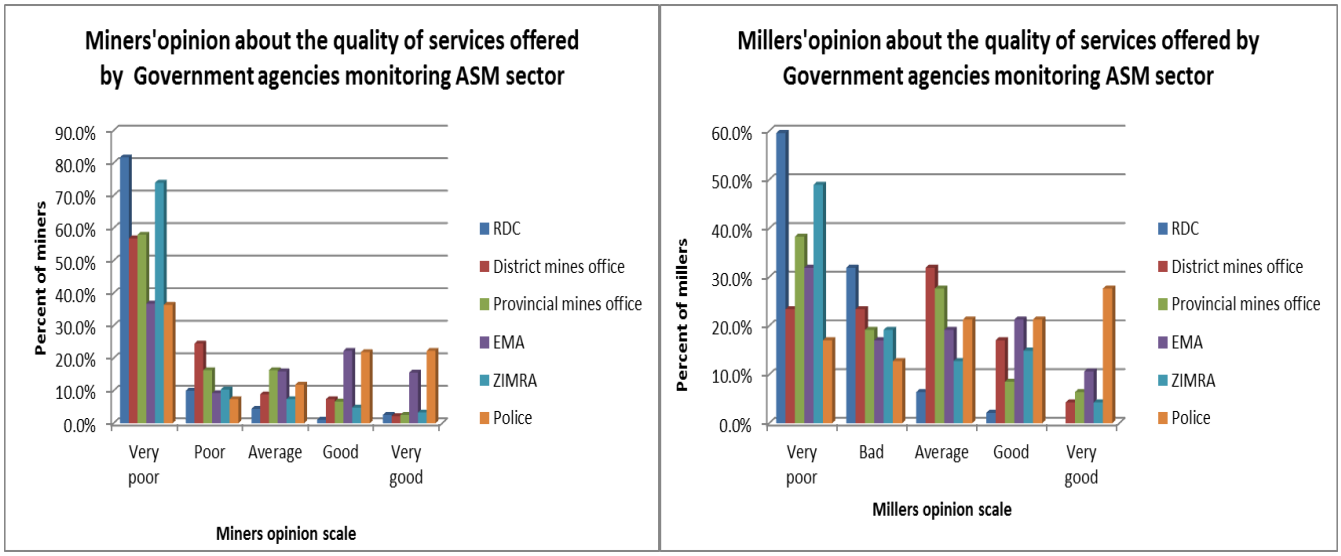


Figure 49: A comparison of the opinions of miners and millers on the quality of services provided by government agencies

From these results, we see that most respondents are not happy with the quality of services provided generally by the Government agencies. However, it is worth noting that slightly above 20% of miners and close to 30% of millers felt the police are providing very good quality services. It should also be noted that about 15% of miners and 10% of millers felt that EMA are providing a very good quality services. Less than 10% of miners reported district mines offices as providing average quality of services as compared to slightly above 30% of millers reported the same. Millers also had average satisfaction about services provided by Provincial mines office where close to 30% reported average quality of services as compared to about 15% of miners who reported the same. A large majority of respondents are not happy with quality of services provided by RDC.

Assessment of local level mining regulatory structure, capacity and resources

The MMMD highlighted its current restructuring exercise which has decentralized and restructured the five mining districts to administrative provincial boundaries. Each provincial office will be headed by a Provincial Mining Director.

In interviews, the MMMD raised concerns about staff capacity in terms of skills and experience and staff turnover which the MMMD is trying to address amid limited resources. *"At the moment we are highly compromised on staff. We have been given a go ahead to recruit now and we have taken technical skilled staff like engineers but because of low salaries we couldn't manage to get staff with experience therefore most new recruits are just recent graduates."* The World Bank has been working with MMMD at a high level in order to reform the ministry at a macro level.

Miners pointed to the lack of resources which limits Government's involvement on the ground in ASM. Understanding the needs of the artisanal miners was also seen as a capacity gap within Government where a key informant reported that *"As much as they may want to support they may end up doing a shoddy job because they are not clear in terms of the needs of these people who are engaged in small scale mining."* A tribute holder emphasised this issue noting *"Those who work in Fidelity and all those who occupy high rank positions in the MMMD are non- miners and will never be miners in their lives yet they are controlling the mining sector."* In addition, the miners felt that their voices are not heard within Government which sours the relationship between miners and Government. A miner noted that *"They see our ideas as valueless because we do not talk the same language so this will always affect the mining sector."*

Segregation of duties/clearly defined mandates of different Government bodies were noted to be a capacity gap. In this instance it was noted by a key informant from NGOs that *"The bureaucracy*

makes it difficult for the Government to provide proper regulation and monitoring because so many people in a structure and they also seem to with overlapping the mandates are involved." Millers noted that according to the laws of Zimbabwe, the MMMD is the only Government agency that can close mines/milling sites down but now EMA and sometimes CID Minerals also come and close them down, so millers are left confused about mandates, roles and responsibilities.

Unclear Ministerial Mandates

The Government is fighting itself. We try to increase production and try to help the Government but we spend most of our time just talking to Government agents. The MHCW has now joined them, they want USD 500 from us every month and we wonder where they think we get all this money. They came from nowhere and we were shocked when and they just left the invoice. There is no relevant statutory instrument. They just said you use mercury and it is affecting the environment. So I replied that is the duty of EMA- Millers FGD

4.4. Economic Costs of Gold Mining and Trading

4.4.1. Fiscal Regime & Taxation:

FPR charges a group of taxes on the gold it receives, namely:

- Royalty;
- Presumptive Tax; and
- FPR's own charge which covers transportation, insurance, cash, overheads and a profit margin.

These all contribute towards an effective tax which is levied on anyone bringing gold to FPR.

Royalty

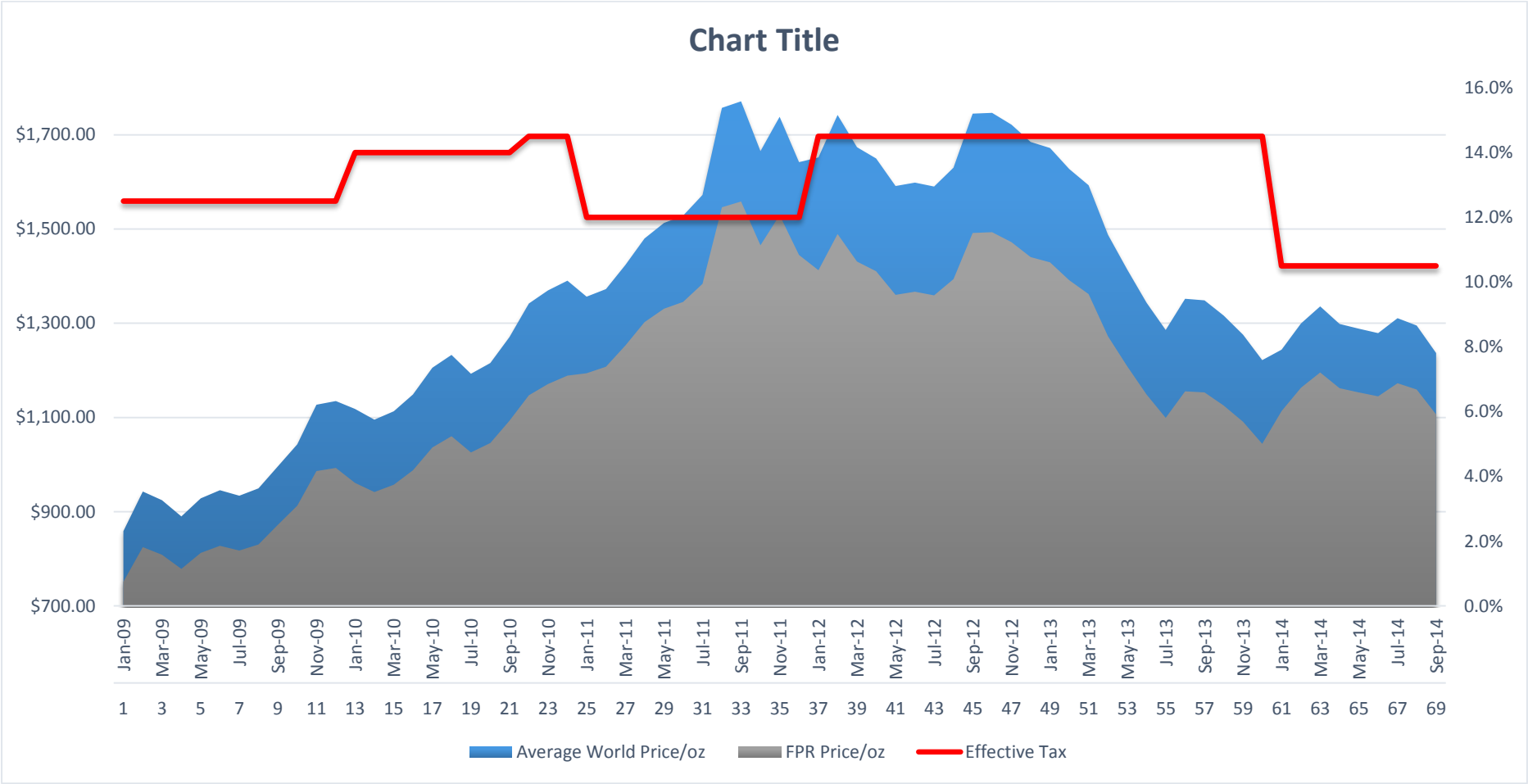
The royalty on gold in Zimbabwe is charged *ad valorem* i.e. as a percentage of gross revenue. Previously, the minerals royalty was an allowable deduction[235] in the determination of taxable income. This had been the case since the introduction of mining royalties in 2004. However with effect from 1 January 2014, the mineral royalty is no longer deductible in determining taxable income. This has largely affected the LSM sector.

Presumptive tax

In 2009, the then Minister of Finance introduced a presumptive tax an all informal businesses which included ASM. Initially the tax was charged at 5% of revenue but was later reviewed down to 2% in January 2011. The presumptive tax was scrapped with effect from 1 October 2014.

[235] *Section 15(2)(f)(iii) of the Income Tax Act before it was repealed on 1 January 2014*

Figure 50: The Impact of the Effective Tax Rate (Royalties, Taxes and FPR's charge) on gold price offered to ASM



4.4.2. Costs of Operating Formally

If an aspiring miner is to follow the letter of the law and obtain all certification required to operate a small-scale mine, they have to go through thirteen procedures which will take at the very least 158 days and cost USD3,220 – fourteen times the monthly minimum wage for a mine worker. To obtain the necessary equipment to start up the mining operations the miner will require a minimum of USD12,300.

To obtain legal authorization to operate a custom mill one has to go through seventeen procedures which take 271 days and cost USD12,300 before one is even permitted to start construction. The construction of a mill consisting of a stamp mill and a ball mill would then cost a further USD68,250 bring the total costs of starting up a custom milling operation to USD80,550.

In order to obtain a connection to the electricity grid the aspiring custom miller would have to go through four administrative steps that take at least 17 days. Millers are often expected to purchase their own material for the power installation and these will include the transformer, wooden poles, insulators, conductors (electrical cable), bolts and nuts. The estimated cost of this material is USD13,000.

FPR is legally the sole buyer of gold in Zimbabwe. The chart below shows the charges that FPR makes on gold it buys namely: tax and its own fee. The fee is also broken down to show how FPR arrives at the fee.

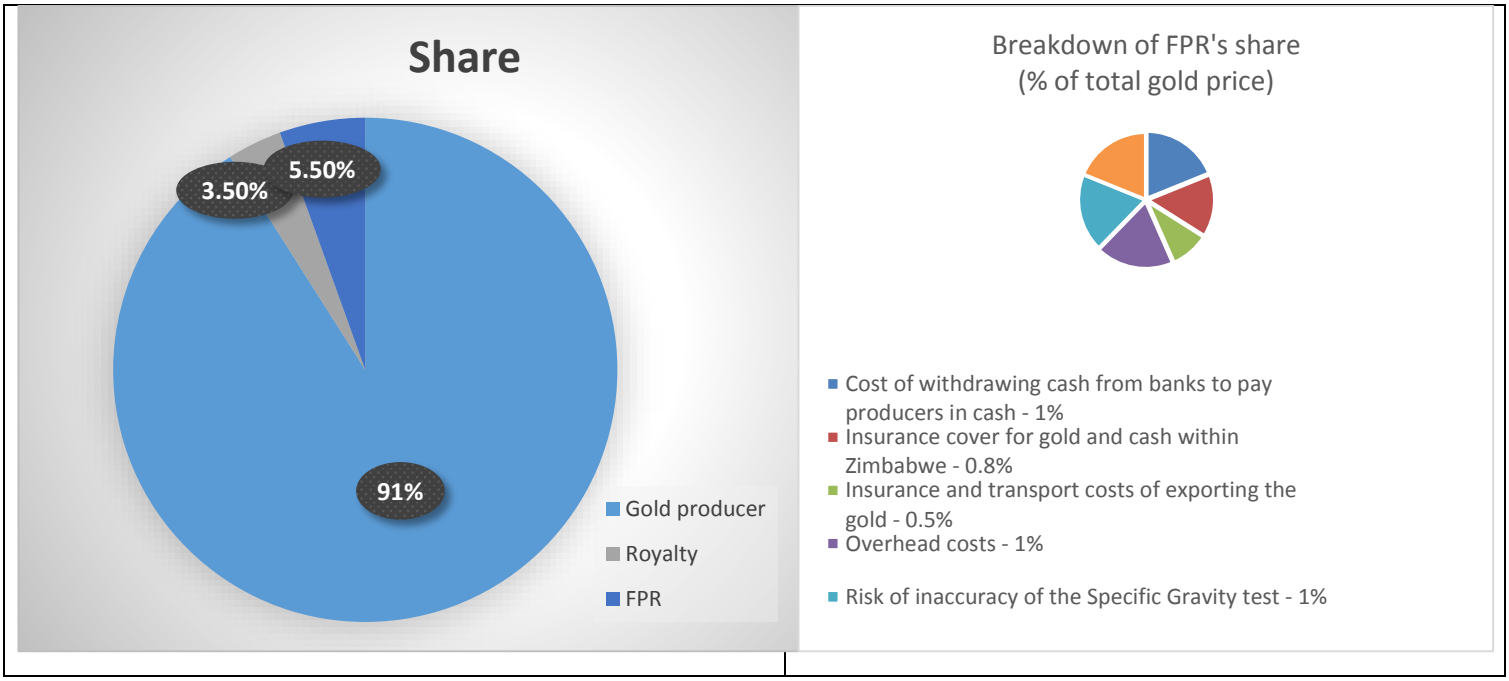


Figure 51: Breakdown of the fees charged by FPR on gold it buys

Miners incur several taxes and payments during operations. With regards to tax, miners are charged a royalty of 3% of gold sold. SSM miners who are registered for tax purposes at ZIMRA also pay an income tax and remit income taxes on behalf of their employees. A carbon tax is charged by EMA for the use of generators and an EIA review fee of USD250 is charged every quarter. With regards to payments, miners pay an annual licence fee to MMMD of USD250, a fee of 5.5% of gold sold to FPR and a unit tax to the RDC which varies from district to district. Additionally SSM miners remit NSSA

payments on behalf of their employees. A detailed analysis of these taxes and payments is provided in the annex 7.

Millers and elution plant operators incur a royalty of 3% of gold sold, income tax, value-added tax (VAT) and carbon tax. They also remit income taxes and NSSA payments on behalf of their employees and as a business incentive, elution plant operators often remit VAT for their customers. With regards to payments millers and elution plant owners pay an annual licence fee of USD8,000 per annum, a fee of 5.5% of gold sold to FPR, an EIA review and discharge licence fees to EMA and a unit tax to the RDC which varies from district to district. These taxes and payments are discussed in full in Annex 7.

The following fines are charged to ASM operators by different agencies:

Type of offense (operating without)	Official fines (USD)	Unofficial payments (USD)
Imposed by the MMMD:-		
- **Mining registration**	$500.00	
- **Blasting and Explosives storage licence**	Closure	$300.00
Imposed by the EMA:-		
- **EIA certificate**	$500.00	
- **Protective wear**	$200.00	
- **Blasting and explosives storage licence**	Closure	$300.00
Imposed by the Zimbabwe Republic Police:-		
- **Ore removal permit**	$50.00	
Transporting gold ore after hours	$50 per encounter	

4.4.3. Costs of Operating Informally

There is no universal procedure to gain access to mining ground for informal miners. In some areas authorities such as chiefs, headmen or political party officials charge unofficial rents.

Generally, financial start-up costs are very low for informal miners. Most illegal miners do not legally own mining claims or explosives and only need a pick and a shovel to do the digging. They transport their ore to milling companies at a cost of USD60.00 per 15km (approx.). When the gold source is alluvial, they do more sieving than digging and they do not need to go to the miller.

However, environmental and social costs may be very high due to shaft accidents (normally not reported to the police), fights due to lack of proper dispute settlement channels, abandoned shafts/gullies and tree cutting among other factor. It was reported that operational safety standards and the climate of corruption are such that, at times, if a colleague is trapped by a collapsed shaft, others may just runaway for fear of police victimisation.

With regard to the following points, it must be emphasised that these reports are based on experiences of miners and the actions of agents working outside their official mandates. These are not official charges and the behaviours of these agents are neither authorised nor endorsed by the agencies involved. Miners may be victims of the ZRP raids and, when this occurs, normally they are charged about USD200.00. In some cases they bribe the ZRP officers using gold proceeds they mine in order to avoid disruptions at work. It was reported by stakeholders that they find CID Minerals, Gold Section, to be the most aggressive and they may charge as much as USD500.00 for illegal miners. EMA may levy charges range from USD200.00-USD500.00 if the miner does not comply with environmental and safety standards. In case of accidents, bribes of about USD20.00-USD100.00, have to be paid to the doctors to treat the patient.

The structure and economics of the informal gold trade have been detailed in figure 19. With respect to the costs associated with the informal trade, it was difficult to get specific data however it was reported that runners working for the gold barons enjoy protection from the police whereas independent gold buyers run a larger risk of being arrested after which the police often take bribes in cash (the police do now want to handle gold). These bribes range from USD500 to USD2000.

Chapter 5: Discussion

5.1. Opportunities for intervention(s) to formalize production and trade of ASM-produced gold

In identifying opportunities for interventions to formalize artisanal and small scale gold mining and trading, the survey gathered recommendations from miners, millers and other key stakeholders through focus groups discussions, key informant interviews. The results are summarised below.

5.1.1. Opportunities within the Government

It has been noted that the Government of Zimbabwe is currently undertaking a series of reforms aiming to improve ASM. The MMMD has acknowledged that the reforms should start with the MMA. A Ministry official commented during discussions that "*The act is still being revised. It was enacted in 1960s and it cuts across whether you produce 1 tonne per year or 10 g per year, and the small scale miners are saying it was not tailor made for the small scale sector. That, I think, is something that has been noted*." The MMMD also reported that the Government has formed a Mining Commission Company. This is an exploration company that is still on infancy stage.

The MMMD also hinted at the potential benefits of supporting the improvement and formalization of ASM to Zimbabwe's global position as gold producer by noting that "*We are aware that we are no longer on the London Bullion Market Association because of what they call production capacity> We are also aware that small scale miners might be producing in small quantities but they are big in number and, once we make use of that number, we anticipate it will be that we can once again achieve the standards of the LBMA*."

5.1.2. Opportunities within the mining sector

There is already recognition among miners that nomadic gold panning makes certain places unsafe to work and to solve this, people must be registered, formalised and the appropriate Government services must exercise their mandated authority.

A sponsor in Kadoma noted the industry development patterns from informal to formal mining. He identified a key role played by the informal mining sector as a training ground for beginners by noting; "*Personally I would say, I got experience from the informal side and now I am on the formal side*." In addition, formalization was seen as only way to grow mining business beyond ASM. However, some miners in focus group discussions noted that they do not always and automatically want to grow and that "*If you are a small scale miner it is better to remain non formalised*."

5.1.3. Incentivizing formalization

One way of incentivizing formalization was said to create a win-win situation where people can be given access to equipment and pay later. Another way is rewarding innovations and good practice where an example was cited of a miner in Filabusi who took a gear box from a Peugeot 405 and connected it to a head gear to form a lever for pulling ore and rubble from the shaft. ZASMC have started supporting miners with awards to recognise artisanal miners who have been able to comply with the Government policies.

The MMMD reported having received suggestions from artisanal and small scale miners who would like to come into agreement with the Ministry where they can be allowed to register their mines and pay relevant fees later. This is same mode of operation used successfully by many millers who provide

transport and milling services to the miners and receive payment upon sale of gold produced. A ministry representative, however, noted the importance of a guarantor in this process citing the example from their experience on equipment distribution.

The banks were seen as very influential in terms of artisanal miners' access to capital. The banks were urged to creatively think of means of guaranteeing the loans that miners can afford. An example was cited on banks accepting mining equipment as collateral for loans. FPR can also be used by the banks to verify artisanal miners books (based on the sales that artisanal miners submit to FPR). This would be an indication of the mine productivity as assurance of return of investment for the banks.

Tribute holding is also a means to incentivize formalization. It has been noted that many claim owners have not been able to exploit/mine the land allocated to them for a number of years while on the other hand a lot of miners are conducting illegal mining because they can't afford legal ownership of claims. Bringing these two stakeholder groups into some form of agreement with mutual and equitable benefits will ensure miners are able to conduct their activities and sell their gold to FPR. This will also mean fewer invasions of mining areas and fewer conflicts between claim owners and illegal miners. **

Mongolia: a case of successful formalization.

Mongolia is a successful case study on how the work of artisanal miners can be promoted and be beneficial even to the nation. This is where artisanal miners, state and development partners intervened to formalize and reverse massive environmental degradation for the benefit of both the Country and these people who were engaged in the artisanal and small scale mining sector.

5.1.4. Needs for successful formalization

To assess the priorities to support formalization, the survey included in the questionnaire, an indicator of key recommendations from miners and millers. This aimed to understand what is most important to the primary beneficiaries of the reforms. The results shows that 32% of respondents would like the Government to prioritize provision of equipment and mechanization of artisanal and small scale mining. Almost 50% of millers would like to see a good ASM policy and legislation.

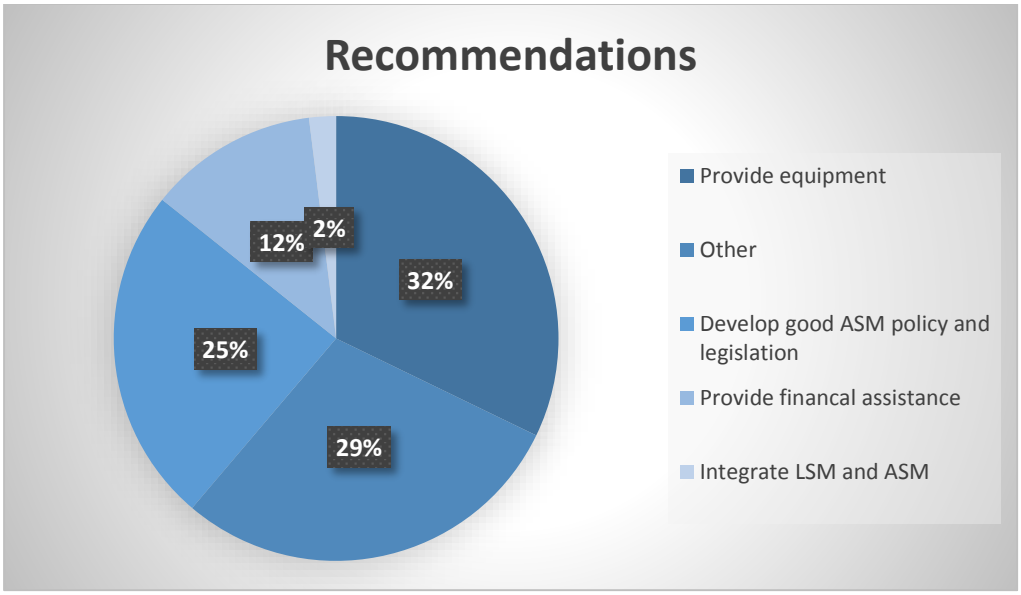


Table 17: Most important recommendation for policy reforms

There was general recognition of the need for a comprehensive policy framework that speaks to artisanal mining, acknowledging it as a formal sector and providing for the protection, regulation, and promotion of ASM miners, processors and traders.

The Government was urged to produce summary versions of the relevant laws and policies in a format that can be understood by the miners (simplified/popularized versions). These should include Environmental Management Act, the RDC Act, the ZINWA Act, the MMA and the Finance Act. It was said that sometimes the police just use these Acts when arresting people and, because miners don't understand what is in the Act they have no recourse to justice if the arrest was illegal.

A nationwide exploration needs to be done to determine mineral deposits by location. This will simplify issuing claims and increase banks confidence in investing in loans to registered artisanal and small scale miners.

Reducing fees for operations will allow more miners to formalize. The Government should also consider mechanisms whereby the public or the private sector could provide loans at reasonable interest and with Government guarantees, along with other financial services, to enable ASM access to capital which is essential for formalization. The Government should also review the tax system to not only regulate but also to incentivize ASM formalization.

The Government should assess artisanal miners' capacities and provide assistance to meet the gaps and address the actual needs of the artisanal and small scale miners including provision of technical support needed rather than focussing solely on enforcement of the laws. Education and empowerment are important. The Government should facilitate trainings to capacitate miners on how to formalize and skills needed for effective and efficient mining, as well as knowledge about mining equipment use and even where to access loans/mining capital. This includes establishing information centres that will disseminate key information about the importance and benefits of formalization.

LSM should be licensed to buy from ASM. Promoting tribute mining can reduce conflicts between LSM and ASM.

5.2. Fully understand the challenges to, and opportunities for, any pilot program, what will be the key roadblocks, and how to manage and interact with influential stakeholder groups.

The survey also sought to understand the challenges, opportunities and prerequisites for successful pilot program for formalization of artisanal and small scale mining and trading. To address this objective, the survey conducted a series of FGDs and KIIs with the aim of gaining an in-depth understanding of issues that influence/affect gold mining and trading sector and how those can be addressed within the context of a pilot intervention.

5.2.1. Challenges to pilot program/ Key roadblocks

Lack of surveys to ascertain mineral deposits in the area was seen as a major challenge by the MMMD who reported "*We can hardly say with confidence what minerals are available where. The miner would just come and say I dreamt of a tonne of gold there and you just say go ahead and peg the area*" This

has resulted in mining business being a risky investment where it was reported that the sponsor is running that risk, the miller is carrying a risk and normally if nothing comes out, he just have to forego the operating expense.

Lack of security also causes the artisanal miners to sell gold to informal traders because of the risk of holding on to gold for protracted periods of time. "*Gold is a very dangerous metal you can be killed for 10g and its equivalent maybe350 but you can move around with it freely the USD350 in cash*" - Miller. A tribute holder in Kadoma emphasised the security issues around gold mining and trading by adding "*Gold is a pull factor, a lot of people come in search of gold. There is a lot of gold here and it's leading to over-population. When the number of people in a certain area increases, crimes start to occur and also prostitution and there is environmental degradation*."

Lack of working tools was a challenge where miners explained that "*Mining is about breaking rocks and we use explosives, water pumps and compressors so there are a lot of expenses that miners are incurring. It is expensive to produce a gram of gold and, at the same time, the price of the gold is going down so the Government needs to chip in and help us with compressors and other mining equipment."* Tribute Holder

Informal payments demanded out of miners and millers by Government officials make business difficult. Millers complained about being asked for 20 USD by police at every road block when transporting ore and, the same time, having to deal with EMA and RDCs charges. The costs however are ultimately all borne by the artisanal miners as one miller reported "*At the end of the day the charges imposed on us end up on the small scale miner working underground because, whatever they are taking off us, we just pass it on and take it off miners' payments*."

Inadequate Government support for Artisanal and small scale miners where there have been frequent arrests and harassments. A ZASMC member narrated "*The government does not fully support artisanal and small scale miners if you look on television there is a program called Talking Farming but we have never heard any program that talks about mining and the Government needs to also look at that*."

Access to basic services around the mining sites is a challenge. Women miners in Shurugwi reported that there's no clinic around the mining area. In terms of electricity supply, millers complained that a lot of people are operating at 50% capacity or less because of interruptions in the electricity supply from ZESA up to 50% of the time. Thus millers spend huge sums of money on power generation. On the other hand, millers with no electricity supply from ZESA complained on the costs for installation of private lines where ZESA demanded that they pay for the poles and cabling which makes the installation costs too high.

High and unequitable license fees for mining and milling . Both miners and millers complained about the high fees that are charged by the Government for one to obtain a claim/ milling license/ hazardous chemicals or explosives handling, environmental impact assessment etc**.** Millers reported paying 8000 USD for milling license and 5000 USD for a claim and explosives license. One miller when comparing his business and that of the other miller noted in FDG that "*He has got 18 stamp Mills now and he pays USD8000 per year and on my own property I have got 3 Stamp Mills but I pay USD8000 per year so for him it's not expensive as compared to me*."

The challenge of environmental destruction where the use of mercury and other chemicals are polluting the environment and may result in serious health issues in the future. "*Mercury is the biggest problem waiting to happen. Most people don't have knowledge and the dangers of carbon poisoning,*

water pollution and probably in 30 years' time there will have deformed children because of chemicals."

Bureaucracy in Fidelity Printers and Refinery is a challenge. "*At my office it takes us all 2 minutes to do the ESG, fill out the log book let the police fill out their log, let Fidelity fill out their log book. We now drive to Fidelity and spend 40 minutes to an hour and half waiting for them to do the same thing. How long does it take them to ESG a piece of Gold? Because it goes through 20 hands before it comes back, that's the thing I mean it's ridiculous*" – A frustrated miller explained in FGD.

Corruption is another challenge that is also reported to be a source of conflicts among miners where it is said that usually there are no challenges in mining unless the block proves to be paying then it prompts the former owner to go and bribe MMMD and try to regain the claim, causing conflicts with existing miners. Miners can be evicted without compensation. A mining sponsor reported that "*If you sell too much tonnage to fidelity you find that your mine will get occupied by many government officials. Police, CID, ZIMRA, army they also want a share*." Millers added that the role of the state is now generating income and that Government officials are using their positions to generate revenue.

5.2.2. Opportunities for pilot program

"*Loans are there but the way to access them in that you have to satisfy certain conditions. It makes it very difficult because you have to have a clear track record. But I think for those who have a track record and are not scared of interest rates, they would get such loans from banks*." – FPR

Faced with limited access to formal financial services, sponsors were reported to be a key source of capital for artisanal and small scale miners providing the necessary mining inputs e.g. explosives and machinery as well as food for the miners for the period of mining. Once gold is recovered, a sponsor gets his share of profit after all the operational costs are deducted. Pilot interventions must explore access to financial services as a key factor in formalization.

The MMMD has a mining development fund: "*As the Ministry, we have what we call mining industry loan fund, which is a vehicle created to assist small scale miners where it provide funds, equipment, technical assistance, advice and things like that."* The ministry noted some shortcoming of the Fund including limited resources compared to the need where services are dependent upon availability of funds. The ministry noted that in 2012, the fund gave out 60 compressors to artisanal miners countrywide However there was a very high non-repayment rate (99% of loan recipients have not yet repaid their loans). Since this was meant to be a revolving fund to help other miners countrywide, it has led to serious impediment to the fund. ZASMC associated the failure to recover the loans to lack of involvement of miners associations. A pilot intervention can further use evidence based methods to incentivize loan repayment among miners.

Low gold recovery in processing plants due to poor technology is a major challenge. "*I estimate with the type of milling that we are using, which is not so efficient, they probably recover maybe up to 40% of the gold which would leave 60% and you find that those that are doing custom milling when the sands that are left they reprocess using vat leaching. it's also an inefficient way of recovering gold estimate about 50% of what remains even 70% of what is recovered and sent to fidelity*" said one miller from- Kwekwe. A pilot intervention on the use of appropriate technologies for mining will give miners a chance to experience first-hand the advantages of improved technology and thus paving way for a change into more efficient technologies for gold recovery. However, this must be directly coupled to the incentives for channelling gold into the formal market otherwise is merely increases product flow into the illegal market.

Gold pricing for licensed buyers (millers) is noted as a challenge where millers feel there is no incentive for them to buy on behalf of FPR. "*You know the thing is that Fidelity wants me to buy the Gold at my elution plant but they won't give you any benefit. Now you work hard to go borrow money in town and paying 4-5% interest a month. Then you have got your security cost. No one is fitting those bills for you and Fidelity thinks you should be buying the Gold for half the percent*", a miller explained during FGD. Incentivizing registered gold buyers will diversify gold trading to include availability of weekend gold markets which miners have pointed out as one of the current shortcomings of existing gold trading system.

Chapter 6: Recommendations for Pilot Intervention

Based on the findings of the scoping study, in order to formalize ASM gold mining and trading the following models of intervention have been recommended:

Model	Description	Target Groups	Merits	Demerits
LSM Co-existence Strategy	Co-existence of LSM, SSM and ASM through allocation of ore bodies of appropriate scale and accessibility on a business/contractual basis by LSM to ASM/SSM. This will be supported by provision of technical support.	LSM SSM ASM Women Youth	Integrates the gold sector in a win-win scenario There is existing buy-in Ensures skills transfer and professionalization of the sector Can be combined with syndication Provision of training in mining skills, sustainable environment management and business skills	May leave out the most marginalized ASM groups
Miller – Service Centre Strategy	Improving existing mills to service centres where more efficient and environmentally sensitive milling takes place and miners have improved recovery of gold and access to training, legal support, assaying services, micro-finance facility	Millers ASM SSM	Focuses on the nexus of the ASM gold sector – the mill. Introduces performance standards and provides a central point for monitoring. Capacitates gold mining and provides a	Needs stringent evaluation to ensure benefits accrue to most marginalized groups of ASM mechanization increases the rate of resource depletion but does not necessarily equate to

	and a workshop for equipment maintenance are hosted.		channel for formal gold trading	efficient resource extraction
Claim Owner Financing Engagement Strategy	Formalizes the Claim Owner – Sponsor – ASM arrangement by providing attractive financial options to claim-owners who are seeking financing.	SSM	Aims to curb 'sponsorship' which is a root cause for informal gold flow Potential to leverage on the existing Mining Investment Loan Fund	Needs stringent planning to ensure sustainability of financing and administration costs are not a significant proportion of the funding required.
Syndication	Capacitating groupings of ASM miners to begin the process of formalization and access to finance & training.	ASM	Targets most marginalized groups of ASM Meets a Zim-ASSET target (500 syndicates)	Some of the target population is highly mobile

There are thematic areas that cut across all the models and these include: gender equity, youth representation, reduction in the use of mercury, access to markets and environmental protection.

There are also some general and specific policy recommendations that may help create an enabling framework for these interventions including:

- The cost of complying with regulations need to be standardized and rationalized in order to ensure compliance across the entire gold mining and trading sector.
- The standard tribute arrangement is rather out-dated and needs to be revised to match existing norms.
- The roles of RDCs in mining need clarification because currently they is an overlapping with MMMD roles.
- There is a gap between how the MMMD and EMA perceive environmental management in ASM which government should ensure is clarified to create cohesion between the two.

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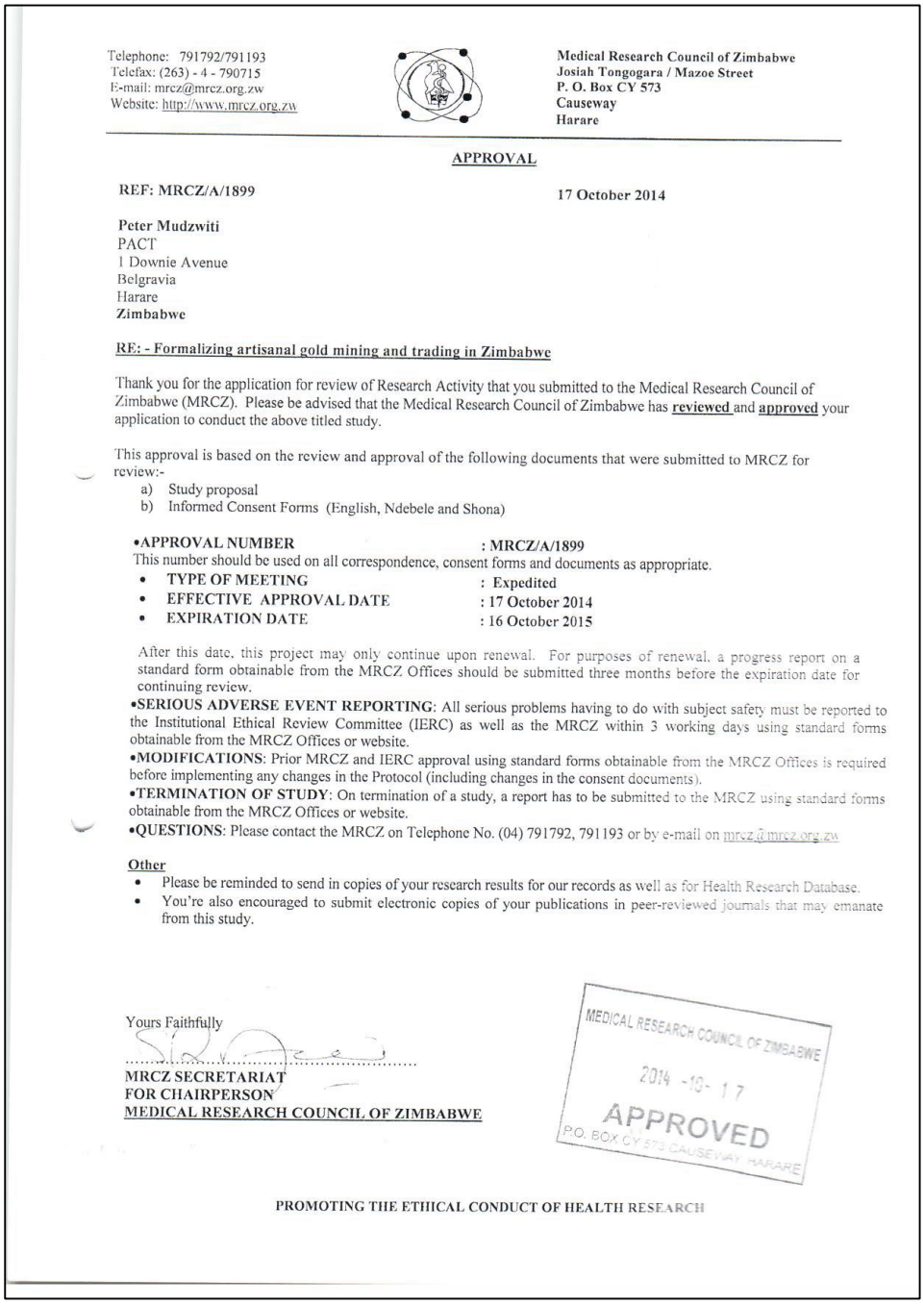
Annexes

Annex 1: Ethical clearance certificate



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Medical Research Council of Zimbabwe
Josiah Tongogara / Mazoe Street
P. O. Box CY 573
Causeway
Harare

APPROVAL

REF: MRCZ/A/1899

17 October 2014

Peter Mudzwiti
PACT
1 Downie Avenue
Belgravia
Harare
Zimbabwe

RE: - Formalizing artisanal gold mining and trading in Zimbabwe

Thank you for the application for review of Research Activity that you submitted to the Medical Research Council of Zimbabwe (MRCZ). Please be advised that the Medical Research Council of Zimbabwe has **reviewed** and **approved** your application to conduct the above titled study.

This approval is based on the review and approval of the following documents that were submitted to MRCZ for review:-

a) Study proposal
b) Informed Consent Forms (English, Ndebele and Shona)

- **APPROVAL NUMBER** : **MRCZ/A/1899**

This number should be used on all correspondence, consent forms and documents as appropriate.

- **TYPE OF MEETING** : **Expedited**
- **EFFECTIVE APPROVAL DATE** : **17 October 2014**
- **EXPIRATION DATE** : **16 October 2015**

After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the MRCZ Offices should be submitted three months before the expiration date for continuing review.

- **SERIOUS ADVERSE EVENT REPORTING**: All serious problems having to do with subject safety must be reported to the Institutional Ethical Review Committee (IERC) as well as the MRCZ within 3 working days using standard forms obtainable from the MRCZ Offices or website.
- **MODIFICATIONS**: Prior MRCZ and IERC approval using standard forms obtainable from the MRCZ Offices is required before implementing any changes in the Protocol (including changes in the consent documents).
- **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the MRCZ using standard forms obtainable from the MRCZ Offices or website.
- **QUESTIONS**: Please contact the MRCZ on Telephone No. (04) 791792, 791193 or by e-mail on mrcz@mrcz.org.zw

Other

- Please be reminded to send in copies of your research results for our records as well as for Health Research Database.
- You're also encouraged to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study.

Yours Faithfully

.....

MRCZ SECRETARIAT
FOR CHAIRPERSON
MEDICAL RESEARCH COUNCIL OF ZIMBABWE

MEDICAL RESEARCH COUNCIL OF ZIMBABWE
2014 -10- 17
APPROVED
P.O. BOX CY 573 CAUSEWAY, HARARE

PROMOTING THE ETHICAL CONDUCT OF HEALTH RESEARCH

Annex 2: Procedures, Cost and Time to become a formal miner

Table 178: Procedures, Cost and Time to become a formal miner

Procedure		Description	Time(days)		Cost (USD)
			Legally mandated	In practice	
REGISTRATION					
1.	Acquisition of Prospecting Licence	Any person over the age of 18 may take up a prospecting license. A prospecting license is not transferrable, and entitles prospecting on land open to prospecting and pegging which includes Communal Land, State land and privately owned land. It entitles the pegging of only one block of claims be it for precious metals or base minerals. A prospecting licence is valid for 2 years.	1	1	$350.00
2.	Obtaining a map	A map of scale 1:25000 of the area is purchased at the Mining Commissioner's office	1	1	$20.00
3.	Hiring an Approved Prospector	An approved prospector (AP) is a person who for the time being is registered in the Register of Approved Prospectors	1	1	$500 minimum

4.	Notice of intention to prospect	Anyone wishing to prospect on town lands; private land, any area of land declared under the Forest Act [Chapter 19:05] to be demarcated forest or protected private forest; or Communal Land must give notice of his intention to do so by: (a) Town lands: writing a registered letter addressed to the local authority concerned; (b) Private land: registered letter addressed to the occupier at his ordinary postal address; (c) unoccupied private land: registered letter addressed to the owner at his ordinary postal address; (d) a demarcated forest: written notice to the chief executive officer of the Forestry Commission established under the Forest Act [Chapter 19:05]; (e) a protected private forest: written notice to the owner of such land in person or by registered letter addressed to the owner at his ordinary postal address or, if such land is unoccupied, to the mining commissioner; (f) Communal Land: written notice to the RDC The prospecting notice is valid for a period of one hundred and twenty days from the date on which it is delivered or posted, as the case may be, and, if such holder has not pegged and registered a block on the land concerned within that period, he	1	1 In practice the AP sends the notice of intention and start prospecting as soon as they send it.	

		should give fresh notice before continuing to exercise his rights under the prospecting licence.			
5.	Posting Prospecting Notice	If there is need for detailed prospecting work such as drilling or trenching, a prospecting notice should post a prospecting notice which is valid for 31 days and gives the right to carry out the detailed prospecting work in a radius of 300m from the prospecting notice. The notice is valid for 31 days.	1		
6.	Discovery peg	As soon as the gold reef is discovered a discovery peg should be erected, This should be within a 300m radius of the prospecting notice and adjacent to the borehole where the reef was discovered.	1		
7.	Pegging	When pegging a claim it should be in the shape of a parallelogram 500m x 300m i.e. 1 hectare. A prospecting licence grants one the right to peg a block of claims i.e. 10 claims on 10 hectares	1		
8.	Posting of Registration Notice	Within a 31 days from the posting of the prospecting notice, the holder of the prospecting licence who has discovered gold may peg a block and then post a registration notice adjacent to the discovery peg. This should be within a 300m radius of the prospecting notice.	1		
Step 10 can only begin 7 days after completion of Step 1.					

10.	Registration of claim	A certificate of registration must be obtained from the Mining Commissioner within 31 days from the day a registration notice is posted.	90 (3 months)		$200.00
11.	Beaconing	Permanent beacons must be erected within 2 months of the date of registration	1		$100.00
12.	Environmental Impact Assessment	As required by law mining operations cannot begin before an EIA is carried out by an EMA-approved consultant	21		$2 000.00
13.	Review of the EIA by EMA		60 (2 months)	60 (2 months If one does not receive a response from EMA within 90 days they can begin mining (Section 100 of the Environmental	$150.00

				Management Act)	
TOTAL			**158 days**		**$3 220.00**

Annex 3: Start-up Costs for a Formal Mining Operation

Table 189:Start-up Costs for a Formal Mining Operation

START-UP COSTS		
Generator	5.5KVA	$1,100.00
Compressor		$7,000.00
Jack hammer		$700.00
Submersible pump	2 horse power	$300.00
Water pipes & connectors 100m		$200.00
Tools (Picks, Shovels, Chisels, Rope, ore buckets, wheel barrow)		$800.00

Safety clothing for 10 workers (Work suits, safety shoes, helmets) Note 1		$1,000.00
Fencing		$2,000.00
Magazine box		$1,200.00
TOTAL		**$12,300.00**

Annex 4: Running Costs of a Formal Mine

Table 20: Running Costs of a Formal Mine

RUNNING COSTS		
Description	Frequency	Cost (USD)
Mine Blaster	Monthly	500.00
Workers (10 workers @ $350.00 each)	Monthy	$3 500.00
NSSA (WCIF & NPS)	Monthly	

Box of Explosives		
Ore removal permit	Every six months	20.00
Milling (charged per hour)	Every time the miner takes ore to the mill	5.00 (or gold equivalent)
Mercury	Every time the miner takes ore to the mill	$100 for a kg
Transport		Variable but around $100. Some millers offer free transportation of ore.
Fuel (for generator and compressor)		
Consummables for mine machinery		
Food for workers		
TOTAL		

Annex 5: Procedure, Cost and Time to register a mill

Table 19: Procedure, Cost and Time to register a mill

Procedure		Description	Time(days)		Cost (USD)
			Legally mandated	In practice	
1.	Registration of a claim		158		$3,220.00
2.	Environmental Impact Assessment	As required by law mining operations cannot begin before an EIA is carried out by an EMA-approved consultant	21		$2,000.00
3.	Review of the EIA by EMA		60		$150.00
4.	Application for a Custom Milling Licence	It is obtained from the Ministry of Mines and Minerals Development	1		$8,000.00
5.	Submission of a site of works plan	Approved by MMMD and Minerals Development	31		$5,000.00

	TOTAL		**271**		**$26,370.00**

Annex 6: Milling start-up costs and getting Electricity for a Milling Operation

Table 202: Milling start-up costs

To setup a ball mill, one requires the following:

Item	Amount (USD)
Ball Mill	20,000.00
Stamp Mill	40,000.00
Driving System (reduction gear box, fan belts and feeding spout)	6,000.00
Concrete foundation (to mount the equipment)	2,000.00
Cyanide/50kg drum	250.00
Total	**68,250.00**

Table 213: Getting Electricity for a Milling Operation

	Procedure	Description	Time(days)		Cost (USD)
			Legally mandated	In practice	
1.	Submitting relevant application form	In the application the miller will have to state the type of power they require.	1		
2.	Waiting period		7		
3.	Receiving necessary inspection	This is carried out by the power supply company, ZETDC so that it can provide the customer with a quotation.	1		
4.	Obtaining external installation works and possibly purchasing material for these works		7		
5.	Concluding necessary supply contract and obtaining final supply.		1		
	TOTAL		17		

		CAPITAL COSTS – in practice, millers are often expected to purchase the material needed to supply them with electricity			
a.	Transformer				$8,000
b.	Wooden Poles				
c.	Insulators				
d.	Conductors (wires)				$5,000
e.	Misceleneous e.g. bolts and nuts				
	TOTAL				**$13,000**

Annex 7: Formal Mining Taxes

Table 24: Formal Mining Taxes

Name	Description	Collecting Agency	Frequency	Rate % / Cost $
Taxes				
Royalty		ZIMRA collected by FPR	Every time gold is sold	3% of total gold sold
Presumptive Tax		ZIMRA collected by FPR if miner is not VAT-registered. THIS TAX WAS REMOVED EFFECTIVE 1 OCTOBER 2014	Every time gold is sold	2% of total gold sold
Income Tax – mine owner	Individual in Business	ZIMRA	Monthly	25% of profit
Income Tax – employees		ZIMRA	Monthly	27.25% of income
Carbon Tax	Charged for the use of a generator	EMA	Monthly	
Payments				
Annual licence		MMMD	Annually	$250
FPR charge			Every time gold is sold	5.5% of gold sold
NSSA Workers Compensation		NSSA	Monthly	2.46% of gross basic salary bill

Insurance Fund (WICF)				
NSSA National Pension Scheme		NSSA	Monthly	3.5% gross basic salary
RDC		RDC	Annually or quarterly depending on district	Variable from district to district
EIA Review		EMA	Quarterly	$210.00
Association Dues		Miner's association		variable

Table 225: Formal Milling and Elution Plant taxes

Name	Description	Collecting Agency	Frequency	Rate % / Cost USD
Taxes				
Royalty		ZIMRA collected by FPR	Every time gold is sold	3% of total gold sold
Income Tax	Individual in Business	ZIMRA	Monthly	25% of profit
Income Tax – employees		ZIMRA	Monthly	27.25% of income
VAT		ZIMRA	Monthly	
VAT - customers	Some elution plant owners cover the VAT for their customers as a	ZIMRA	Monthly	

	means to incentivize the clientele.			
Carbon Tax	Charged for the use of a generator	EMA	Monthly	
Payments				
Annual licence		MMMD	Annually	$8000.00 for millers
FPR charge			Every time gold is sold	5.5% of gold sold
NSSA Workers Compensation Insurance Fund (WICF)		NSSA	Monthly	2.46% of gross basic salary bill
NSSA National Pension Scheme		NSSA	Monthly	3.5% gross basic salary
RDC	For millers the levy is charged per each stamp mill. Legally the RDCs are supposed to charge per unit where the first unit is a 100 employees and the second is the next 50 employees, third is the other 50 employees and so forth.	RDC	Annually or quarterly depending on district	Variable from district to district

EIA Review		EMA	Quarterly	$210.00
Association Dues		Miner's/Miller's association		
Discharge Licence Fee		EMA		
Trade and Commerce				